



APOLLO 12

14-24 NOVEMBER 1969

an essay by
HAMISH LINDSAY





*"Whoopee!
Man, that may have been a small one for Neil,
but that's a long one for me!"*

Charles 'Pete' Conrad

APOLLO 12

14-24 NOVEMBER 1969

an essay by
HAMISH LINDSAY

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

EDITORIAL NOTES

This description of the Apollo 12 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 12 CREW



Charles 'Pete' Conrad Jr, Richard F. Gordon Jr, and Alan L. Bean
Image: NASA

AS-507/CSM-108/LM-6 H-1 MISSION NCG 737

PRIME CREW

Commander: Charles 'Pete' Conrad Jr
Command Module Pilot: Richard F. Gordon Jr
Lunar Module Pilot: Alan L. Bean

BACK-UP CREW

Commander: David R. Scott
CM Pilot: Alfred M. Worden
LM Pilot: James B. Irwin

SPACECRAFT

Command Module: **YANKEE CLIPPER** CSM-108
Lunar Module: **INTREPID** LM-6
Saturn V: SA-507

Note: The indented text in this essay are excerpts from interviews by Hamish Lindsay with NASA astronauts and personnel. Other comments, including air-to-ground conversations are in *italics*.



Mission Fact Box

Launch

Launch Complex – 39A, Cape Kennedy
Friday, 14 November 1969
1122:00 US EST / 1622:00 UTC
[Saturday, 15 November 1969, 0222:00 AEST]

Mission duration

10 days, 4 hours, 36 minutes, 25 seconds

Lunar orbit insertion

18 November 1969, 0347:23 UTC

Lunar orbital data

Lunar orbit – 122.4 x 101. 1 kilometres
Total time in orbit – 3 days, 17 hours, 2 mins
Orbits – 45

Landing data

Landing site – Ocean of Storms,
Surveyor Crater, 3.01239°S 23.42157°W
Landing – 19 November 1969, 0654:35 UTC

Extra Vehicular Activities (EVAs)

Total EVAs – 2
First EVA – 3 hours, 56 minutes, 03 seconds
Second EVA – 3 hours, 49 minutes, 15 seconds
Lunar samples collected: 34 kilograms
Total time on surface from landing to launch:
31 hours, 31 minutes, 12 seconds

Lunar Module ascent and docking

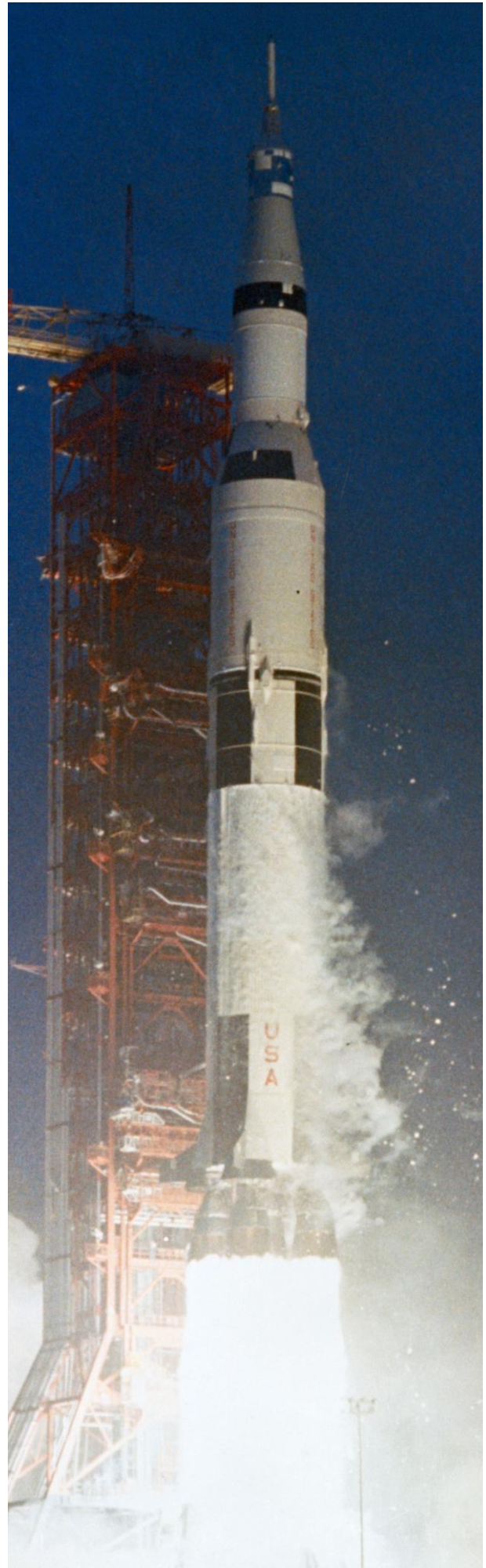
Launch – 20 November 1969, 1425:47 UTC
Docking – 20 November 1969, 1758:20 UTC
Undocking – 20 November 1969, 2021:31 UTC

Lunar orbit departure

CSM – 21 November 1969, 2049:16 UTC

Splashdown

CM – 24 November 1969, 2058:24 UTC
South Pacific Ocean - 15°46.6'S 165°9'W
Recovery ship: USS Hornet



AUDIO FILES

Audio files in this document are made available in two ways: via a clickable URL link in the document or via a scannable QR code using your phone or tablet.



LISTEN

Click this icon for a direct link to the file.



Scan the QR icon with your phone or tablet to listen to the audio file.



The Apollo 12 crew – Conrad, Gordon and Bean. Image: NASA/KSC

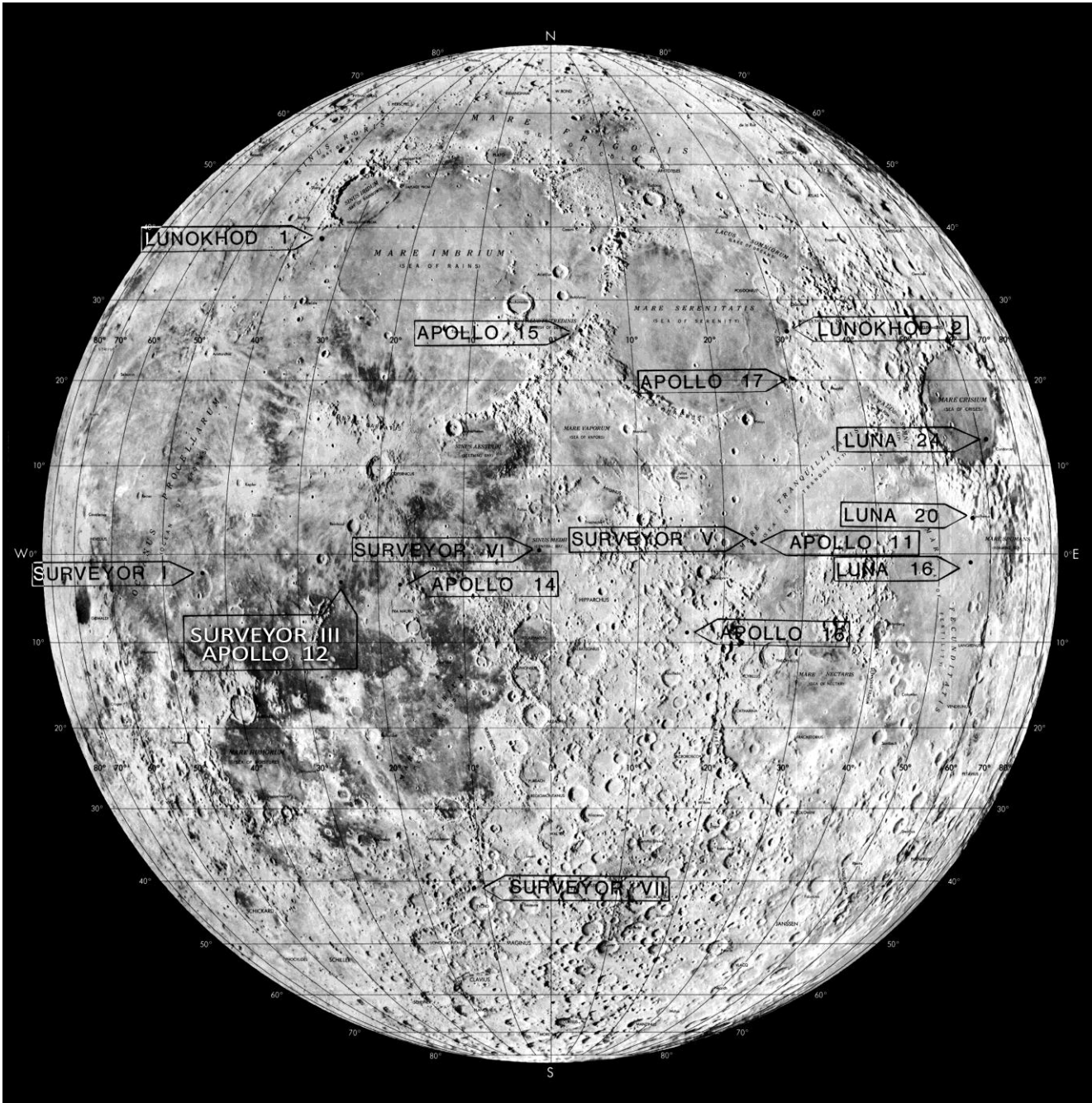
Apollo 12

Now that a complete Moon landing mission had been successfully accomplished with Apollo 11, we settled down to support a steady stream of missions to the Moon, aware things could go horribly wrong, but comfortable in the knowledge that the hardware and personnel could do it. All those moments of anguish we experienced with the unknowns of Apollo's 8 and 11 faded into the past; we now had a straightforward job to do. The sound of astronauts talking and walking around the Moon became quite normal around the rooms and corridors of Honeysuckle Creek. We prepared for a repeat success of Apollo 11 with the next mission, Apollo 12.

Major changes from Apollo 11 included the possible use of a hybrid trajectory rather than a free-return trajectory and scheduling two periods of lunar surface exploration by both crewmen. Hybrid trajectories were fuel-saving flight paths which, unlike free-return trajectories, would not return the spacecraft to earth if the service module's main propulsion system failed to put it into lunar orbit. They were designed so that in case of such a failure the lunar module's descent engine could correct the resulting flight path (which might put the spacecraft with its three occupants into solar orbit) for return to earth.

Apollo 12 began with 10 landing sites to choose from. This was reduced to 5, including site 5, the western mare site preferred by the scientists, and the Surveyor III site. Chairman of the Apollo Site Selection Board, Major General Sam Phillips, chose the Surveyor III site as the target for Apollo 12, though the scientists unanimously rejected the choice. They considered the inert spacecraft to be an attractive nuisance that would divert the astronauts from more important work. However, the opportunity to recover some components from the Surveyor spacecraft for analysis and demonstrating a pin point landing was too good to miss, so the Surveyor III site was confirmed for Apollo 12.

Deployment of the first ALSEP was high on the priority list, since scientists had been disgruntled by the decision to fly a simplified package of surface instruments on Apollo 11. Geologists wanted the Apollo 12 astronauts to be somewhat more selective than their predecessors in collecting samples and stressed the importance of documenting (photographing and describing) them. They also preferred more rocks and less dust, if possible.



The Apollo 12 landing site, with the other landing sites for comparison.

Image: Lunar and Planetary Science Institute

Originally the Lunar Module pilot for Apollo 12 was listed to be Clifton Williams. Alan Bean was scheduled for the Apollo Applications Program, to follow Apollo. At the time Conrad and his crew were training for the first lunar landing as back up crew, but the game of musical chairs was still playing, and the music stopped again on 5 October 1967.

Williams was flying home to see his dying father when his T-38 jet went into an uncontrollable roll and crashed, too low for his parachute to save him. Bean couldn't believe his ears when he heard his old mate Conrad asking him to join his crew as Lunar Module pilot.

The astronauts, Charles Pete Conrad, Alan Bean and Dick Gordon, were a team of close friends from well before they joined NASA. All Navy pilots, they had been shipboard cabin-mates flying F-4's off the carrier USS Ranger.

I first met Conrad at Carnarvon when he was Capcom for the Gemini III mission, before he had been into space. At first I thought he was an eccentric (*but nice*) character. Not at all what I had imagined a Top Gun test pilot to be. He would be studying at a table in the canteen, and would suddenly jump up, prance around going, "Doop, de doop, doop doop..." to no-one in particular, then sit down & bend over his books again.



Apollo 12 Commander Pete Conrad suits up prior to launch.
Note the suit technician putting a sandwich in Pete's pocket! Image: NASA/KSC

It was just him. He was to prove a Top Gun in space, turning out to be one of the outstanding astronauts in the Gemini, Apollo and Skylab programs. In fact, he was the best astronaut in the Apollo simulators, able to handle the toughest assignments thrown at him. I always loved the story of the time he was shoved a sheet of blank white paper by the psychologists and asked what did he see in it? *"It's upside down,"* he answered. That probably sums him up.

The back up crew members were Dave Scott, Al Worden, and Jim Irwin.

The Mission Insignia showed an American clipper ship for a navy crew and to anticipate the spacecraft providing a means of travelling between the planets the way ships opened the seas to commerce. The four stars represented the crew plus Clifton Williams.

Pete Conrad, Commander of the mission: "A lot of people thought we named the spacecraft after naval vessels like the USS Intrepid which

we did not. There was a lot of controversy over the names because the military was not too popular in those days in the United States and some people accused us of using military names for our spacecraft when in fact they did not have the proper knowledge. North American Rockwell built the Command Module, and we had people out there submit names for the spacecraft with twenty five words why the name. We had them do the same thing at Grumman Aircraft for the Lunar Module. I wanted to let the people that built them name them. Yankee Clipper was named after the US clipper ship, one of the first US ventures around the world in the maritime world. The guy at Grumman named the Lunar Module Intrepid based on the Webster's Dictionary definition of the word. We then picked the final names out of the lists."

Parkes was called up for this mission. Dr Bowen, Chief of the Radio Physics Division, decided that



Apollo 12 at 'launch commit' as seen from the tower. Image: NASA/KSC

the tower had to be reinforced before the next mission, which meant 7 weeks of working two shifts per day. The control room was completely rearranged and equipment from the tracking ship Vanguard was added. Staff from Tidbinbilla replaced the NASA crew that operated the back-end equipment such as the special receivers and tape recorders during Apollo 11. Parkes was ready to support on 7 November. It had been given a new parametric amplifier to improve the noise figure but suffered 'out of specification' problems, combined with offset and on-axis feed installation, the antenna wasn't declared Green and ready to support the mission until 14 November.

At Honeysuckle we went into this mission with a "Red, can support USB Receiver/Exciter Feed System." The spurs were still haunting us, though not expected to cause any problems. Confident it would not affect the mission, Goddard decided to call us Green just before launch. On 28 October we found we had an X-Y Encoder non-linearity

problem on the antenna. Frank Campbell installed a replacement encoder, which showed a 0.01 degree shift in the Y axis so the system was declared "Red, can support", but as the discrepancy was within specification limits Goddard decided to declare the system "Green" on 5 November.

LAUNCH

President and Mrs Nixon watched the launch from the Firing Room at the Cape, the only time an American President in office witnessed an Apollo launch. After the launch he addressed the team in the Fire Control Room. He promised his government would back the American space program, then referring to the three astronauts in part of the speech, he said,

"I do want you to know that I realise that, except for what you are doing here, they couldn't be there... ..every one of the astronauts, when they come to the White House, makes the point that those on the ground, the engineers, the



Apollo 12 lifts off the pad. Image: NASA/KSC

Listen to the launch

As recorded by Bernard Scrivener at Honeysuckle Creek. See updated audio transfers on [this page](#).

Recording starts at t-17s and includes the lightning strike and recovery of onboard systems.

Jack King calls the countdown, up until Tower Clear.

The lightning strike occurs 55 seconds into the clip. Quiet concerned conversation in the Honeysuckle Creek Station Director's office is just audible.



570kb mp3 runs for 4 minutes 52 seconds.



technicians, the scientists, and all those who work on the program, that they are really the heart of this great, successful experience for the American people, and for all the people of the world."

Chris Kraft, Director of Flight Operations, said: "Launch has always been an uneasy time for me, and I always looked forward to successful separation from the booster. When one adds to this an apprehension caused by bad weather over the Cape, I become even more concerned. It turned out that all of these elements were present for Apollo 12."

As if to prepare this crew of navy aviators for the Ocean of Storms, the launch area was lashed by heavy rain during the countdown. The astronauts gazed uneasily at the rivulets of water running down the windows as they went through their checklists. Luckily, when the time to launch was reached a reconnaissance aircraft from the Air Force's Eastern Test Range reported favourable conditions with the nearest lightning some 30 kilometres away.

"Due to the fact that the weather predictions were as unpredictable as they were, and all our minimums were met, we decided to launch. Once we got the report back from the aircraft that we

did not have an electrical potential, all of our minimums were satisfied," explained Walter Kapryan, the Launch Director. So, still blanketed by light rain, Apollo 12 was launched into the overcast stratocumulus cloud with a base of 2,100 feet above the ground. The temperature was 20°C, humidity was high at 92%, and the wind was light at 13 knots from the west.

Rising from Pad 39A at 11.22 am EST Friday 14 November (0222 AEST Saturday 15 November) in defiance of Mission Rule 1-404, which said no vehicle shall be launched in a thunderstorm, the huge Saturn V vanished into the murk

At 22 seconds Conrad called down, *"It's a lovely lift-off. It's not bad at all."*

HIT BY LIGHTNING

Observers then saw two bright blue streaks of lightning right where the rocket had been!

The strike's path seemed to go from a cloud to the spacecraft then via the rocket's exhaust tail to the launch tower on the ground beneath. Pete Conrad showed why top test pilots are different from the rest of us when 36 seconds after lift-off, at a height of 1,859 metres, they were hit by lightning. At 52 seconds they were hit again. The control panel indicators went haywire, and the attitude ball began pitching. If the vehicle really was beginning to fly erratically there were only seconds before it would break up and explode. The abort handle was waiting at Conrad's elbow, but he calmly announced to the ground controllers: *"Where are we going?"*

Gordon added, *"I can't see; there's something wrong."*

Conrad, *"Okay, we just lost the platform, gang. I don't know what happened here; we had everything in the world drop out..... I got three fuel cell lights, an AC bus light, a fuel cell disconnect, AC bus overload 1 and 2, Main Bus A and B out."*

Were they still on course? Looking out the window was no help – all they could see were thick clouds. Their attitude ball was no help either – it was pitching rapidly with the second hit, but Conrad felt by instinct they were still on course so didn't reach for the abort handle. It was a gutsy decision – if the booster slewed too far off course the vehicle would break apart and explode.



Lightning plays around the launch tower as Apollo 12 ascends towards orbit. Image: NASA/KSC

With the master alarm ringing in his ears, Alan Bean thought he knew all the spacecraft's electrical faults, but looking along the panel of glowing warning lights, he couldn't recognise a pattern to any of them – he had never seen so many lights before.

Conrad: "I had a pretty good idea what had happened. I had the only window at the time the booster protector covered the other windows and I saw a little glow outside and a crackle in the headphones and, of course, the master caution & warning alarms came on immediately and I glanced up at the panel and in all the simulations they had ever done they had never figured out how to light all eleven electrical warning lights at once by Golly, they were all lit, so I knew right away that this was for real.

Our high bit rate telemetry had fallen off the line so on the ground they weren't reading us very well on what was happening, so they got us to switch to the backup telemetry system. The ground then got a look at us and they could see that a bunch of things had fallen off the line, but there weren't any shorts or anything bad on the systems, so we elected to do nothing until we got through staging. When we got through

staging then we went about putting things back on line."

Down in mission control this was Gerry Griffin's first mission as a Flight Director. He urged his team to concentrate on the problem. The controllers staring at their screens saw the normally steady flow of figures from the spacecraft filing past were suddenly replaced by a meaningless jumble of characters. All the telemetry signals had dropped out! Suddenly the spacecraft crew and flight controllers were flying blind, only the Saturn guidance and computer system was keeping the flight going.

John Aaron was the EECOM, the flight controller in charge of the Command and Service Module electrical systems, and he recalled,

"You must remember we did not have a live television view of the launch. I was just looking at control screens which only had data and curves on them. The first thing I realised was we had a major electrical anomaly. But I did recognise a pattern. When we trained for this condition with our simulators it would always read zeros.



Lightning struck the launch tower crane platform and the mobile-launcher pad. Image: NASA/KSC

It so happened that a year before I was monitoring an entry sequence test from the Kennedy Space Center, and the technicians inadvertently got the whole spacecraft being powered by only one battery. I remembered the random pattern that generated on the telemetry system, and for some reason just filed it off to the back of my mind. I did go in the office the next day to reconstruct what happened and found this obscure SCE (Signal Condition Equipment) switch. Few people knew it was there, or what it was for.

It was lucky I was the EECOM monitoring the test that night and when it turned out that we had the problem, I happened to be the EECOM on the console. I don't think any other EECOM would have recognised that random pattern. Our simulators did not train us for it, but I saw it through the procedural screw up. Although the test happened a year before, that pattern was etched in my mind, and I am talking about a pattern of thirty or forty parameters. Instead of reading zeros, one would read six point something, another read eight point something, which were nonsense numbers for a 28 volt power system."

RECOVERY

Griffin called Aaron, "How is it looking..... EECOM what do you see?"

Aaron scanned his displays before answering, "Flight, have the crew try the SCE to Aux." Griffin didn't know what Aaron was talking about but at 1 minute 36 seconds passed the instruction on to Capcom Jerry Carr who called the spacecraft,

"Apollo 12, Houston. Try SCE to auxiliary. Over."

Conrad was lost, "Try FCE to Auxiliary."

Carr, "SCE, SCE to auxiliary."



In the spacecraft Bean heard Carr's instruction, found the Signal Condition Equipment switch, reached across to flip it down to "Auxiliary" which selected an alternate power supply, and order was restored to the flight controllers' television screens.

Aaron, "We now got back live telemetry that was representative of the actual readouts on the spacecraft. We then realised that the fuel cells, the main power source, had been kicked off the line, all three of them, and the whole spacecraft was now being powered by the emergency re-entry batteries in the Command Module, which worked on a lower voltage. They were never designed to carry the full load of the Command and Service Module in a launch configuration. The next call I made was to reset the fuel cells and the voltage was returned to normal.

I felt quite relieved just to get those guys into low Earth orbit, but I will never forget what Chris Kraft said to me that day, he said, 'Young man, don't feel like we have to go to the Moon today, but on the other hand if you and the other systems people here can quickly check this vehicle out and you feel comfortable with how to do that then we're okay to go, but don't feel you have to be pressured to go to the Moon today after what happened. We don't have to go to the Moon today.'

We then dreamed up a way to do a full vehicle system checkout by improvising and cutting and pasting some of the crew procedures that they already had."

Nothing serious seemed to have happened, so while still hurtling ever faster up into space, the crew had restored all the systems except the inertial guidance system, and that was set by the 32 minute mark as they shot into the darkness over Africa.

AOS at Carnarvon was at 0314:15 AEST, much earlier than predicted, inferring that the spacecraft was in a lower orbit than planned. More agonising by the flight controllers in the Trench was replaced by relief when it was found that an atmospheric anomaly had bent the signal at the horizon.

Over Carnarvon Conrad tried to confirm to the ground that they had been hit by lightning,

"I saw some illumination out the window; I'd almost be positive that we got hit by lightning some place."

Carr, *"Pete. I don't think we got all of that transmission."*

Conrad, *"Okay. I'm just saying – in thinking back to when we had our big glitch, I remember seeing it get light outside the window. We were in the clouds; I'm pretty sure we got hit by lightning."*

Listen to the pass

As recorded from Net 1 and 2 by Bernard Scrivener at Honeysuckle Creek.

The clip starts as [Carnarvon](#) has AOS and ends just as Honeysuckle has AOS.

Starting 23 seconds into the clip, Houston Commtech calls Carnarvon Commtech to ask if they are remoting VHF or S-band to Net 1. The answer is VHF, which explains the early acquisition. (S-band frequencies are line-of-sight only.)

From 2:15, Pete Conrad discusses the lightning strike.

At 5:14, Major Doc Weaver at [ARIA Control](#) in Florida calls "Network" (Ernie Randall) in Houston to report that ARIA 4 is now airborne out of Andersen Air Force Base on Guam – this would be to support TLI on Rev 2.

Various Honeysuckle loops may be heard at various points in the recording – Mike Dinn's voice is faintly heard several times (e.g. at 6:22). Honeysuckle has AOS at 7:28.



900kb mp3 runs for 7 minutes 37 seconds.



Carnarvon was followed by a brief 3 minute 22 second pass over Honeysuckle Creek at 0323. Carnarvon saw the second time around at 1847 AEST, when the Go for the Moon was passed up, but Honeysuckle Creek did not get a second Earth orbit pass.

Picture digitally cleaned using AI



Ron Chivers with the Honeysuckle Creek 1218 on the right. Photo supplied by: Ron Chivers.

There was some concern that the lightning may have damaged the parachute system in the nose of the Command Module or affected some of the Lunar Module systems at launch, particularly the highly sensitive diodes of the landing radar. The flight controllers realised that if the parachutes had been damaged the crew were going to die anyway, so the mission might as well continue on to the Moon.

Apollo 12 entered a 185.4 by 181.1 kilometre Earth orbit at 0233:43 AEST with a period of 88.2 minutes and a velocity of 28,053 kilometres per hour. A Saturn IVB 5 minute 41.1 second burn at the end of the second orbit boosted their speed by 1,662.4 kilometres per hour to send them off to the Moon at 0515:13 AEST. The previous Apollo lunar missions flew a free-return trans-lunar coast, meaning the trajectory would sling-shoot the spacecraft around the Moon and back to Earth. Apollo 12 flew a hybrid free-return so that the LM's descent propulsion system could be used for a safe return to Earth if the spacecraft failed to enter lunar orbit.

After separation at 0540:04 AEST the LM was retrieved from the Saturn IVB at 0548:53 and the Saturn IVB rocket was sent off into an Earth-Moon orbit. It was planned to go into a solar orbit, but due to a longer ullage burn the rocket ended up in an Earth-Moon orbit.

The spacecraft may have been Go, but on the ground at Honeysuckle Creek we were having some fun. At 2252 AEST on the first day our Command Computer was cycling during our 2-way track, and three uplinked commands did not appear on the history printout and five minutes later 5 command executes did not appear on the post-fault command history. Mission control then requested we hand over 2-way to Guam at 2259:04 AEST and 2-way was handed back to us at 2304:04. There were a total of five computer faults over a period of 94 hours, which were never definitely located.

At 1405 AEST on 18 November, just before Apollo 12 was due to go into lunar orbit, our Univac 1218 computer was declared "*Red, cannot support*" when it could not operate CADPCS and



Hamish Lindsay snapped this Polaroid in the USB area during the lunar orbit TV broadcast.

The top monitor shows the TV being received at Honeysuckle from Apollo 12.

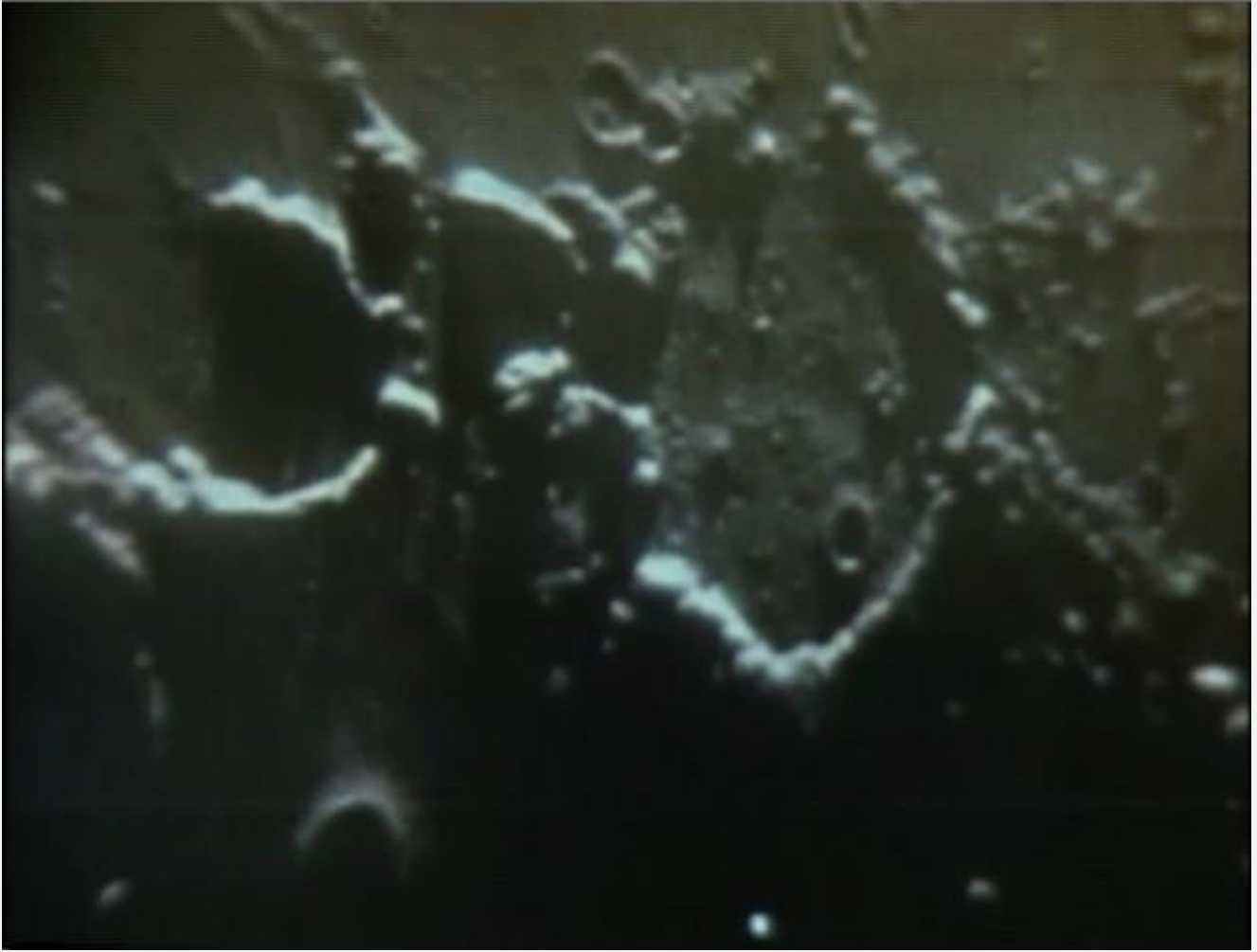
The spacecraft is nearing the terminator, as can be seen from the long shadows on the TV picture. Note also the boresight TV monitor below, showing that Honeysuckle's antenna was tracking Apollo 12 as it neared the terminator.

The servo console and window are just to the left of this photo. Image: Hamish Lindsay

diagnostics without failing. This was the computer to generate the predictions to point the antenna.

The Wing 1218 computer was used to process the Prime 29-point acquisition messages until the problem was partly fixed, and the computer was declared "Red, can support" at 1528 on 20 November until the end of the mission. Never

actually found, the intermittent fault disappeared when the printed circuit board located at 12C of Chassis 7 was removed and plugged back in again, so, the fault was thought to be a dirty contact or the board not seating correctly, and the computer was declared Green well after the mission on 1 December.



As seen on the top monitor of the previous image, this is the picture as broadcast from Apollo 12.
Image: Screen capture from the Apollo 12 film restored and released by Spacecraft Films.

INTO LUNAR ORBIT

After an uneventful journey of 80 hours, 38 minutes across the void Apollo 12 arrived at the Moon and we had the first LOS behind the rim at 1333:46 AEST. Shortly after, Apollo 12 raced into a lunar orbit insertion orbit burn at 7,887 kilometres per hour. A 5 minute 52.25 second burn at 1353 AEST on Tuesday 18 November set the spacecraft into a 315.2 by 114.2 kilometre orbit.

During the first orbit good sharp television pictures of the lunar surface were sent back for 33 minutes at 1455 AEST.

The servo console and window are just to the left of this photo.

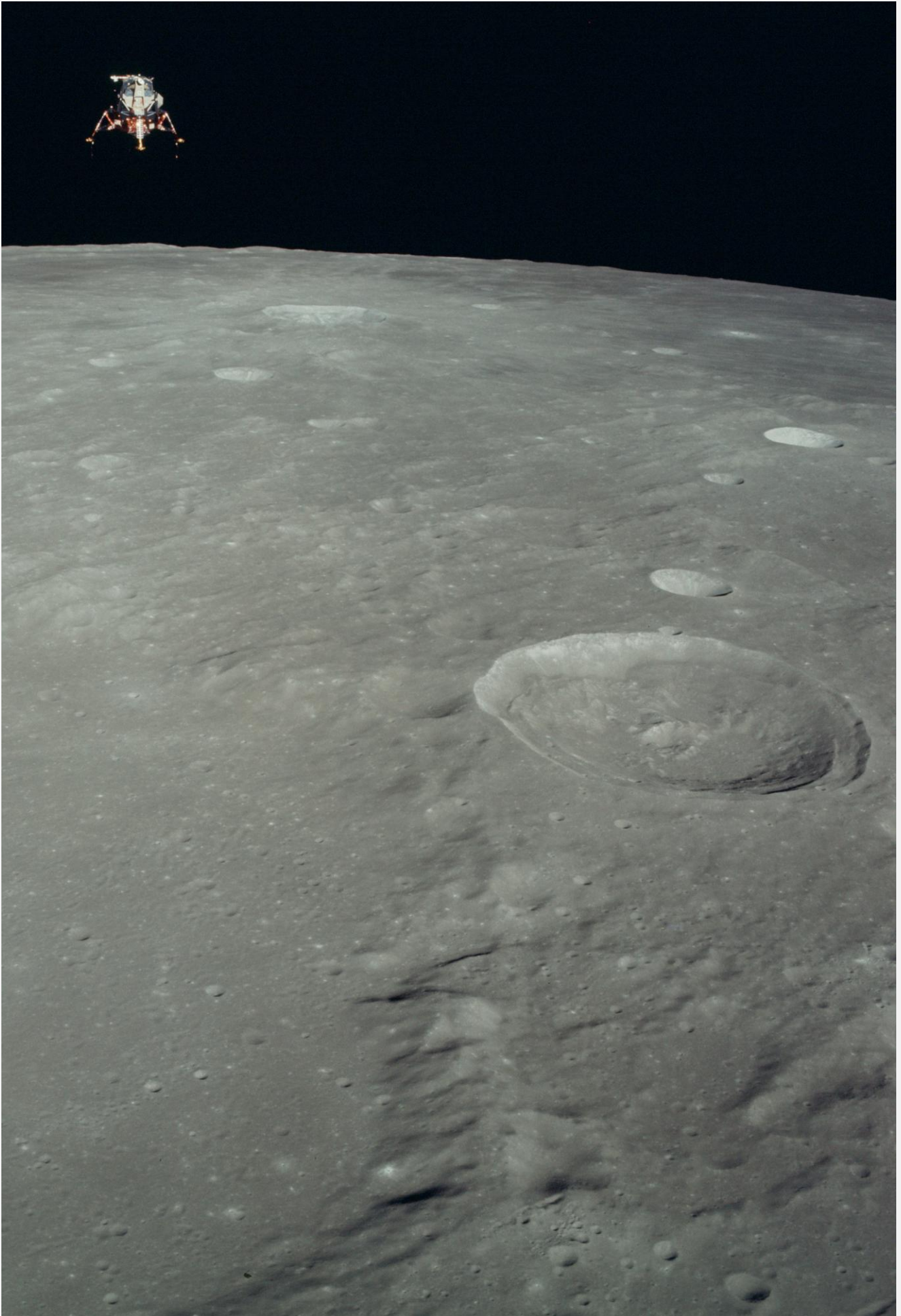
As they were approaching the time for the LM to separate from the CSM, an anxious Conrad grunted to his friend *"We've got to move through the checklist faster, Al."* Bean was taking time to make sure every step was right, as this time their

lives were on the line, not like the simulations. He tried to go faster, knowing he had to, but afraid of making a mistake. They barely made the scheduled moment when the LM undocked at 1416 AEST 19 November.

Conrad and Bean remembered the Apollo 11 episode when some excess oxygen left in the connecting tunnel deflected them 6.4 kilometres away from their target. They had to do better, in fact they had to be perfect to land beside the Surveyor spacecraft, though before the mission they were advised to avoid drawing too much attention to landing beside the Surveyor in case they landed too far away to be able to walk to it.

LUNAR LANDING

Intrepid flew across the desolate moonscape. All Conrad could see was a jumbled mass of similar shadows and craters in the panorama of the landing area spread in the window before him.



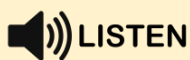
Intrepid hangs above the lunar surface, just before its descent. Image: NASA

How could they possibly pick out a particular crater in the time available? Remembering the trouble the experts had locating the Apollo 11 landing point, Conrad felt apprehensive about finding a speck, the Surveyor spacecraft and its particular crater, buried among these thousands of look-alikes.

As he flew down towards the lunar surface, Conrad glanced out his window to see if he could see the horizon. At 7,620 metres he spotted it along the bottom of the window, but found it didn't help, so stuck to following his gauges and meters. He let the computer point Intrepid at the target and suddenly he spotted it on the LPD (Landing Point Designator, scales marked on the window) as they homed in to a pinpoint landing in the Snowman and the Surveyor III spacecraft, 2,029 kilometres west of the Apollo 11 landing site.

After taking over Program 66 manual control at a height of 122 metres Conrad found he had to sidestep the Surveyor crater:

"There it is!"

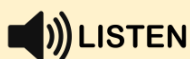


Excerpt. 72kb mp3 runs for 35 seconds.



Listen to the full descent and landing

As recorded at Honeysuckle from Net 1. Recording starts at 110:17:30GET as Jerry Carr calls, "Go for PDI" (i.e. Powered Descent Insertion). Touchdown is at 14'55" into the clip.



2.1MB mp3 runs for 18 minutes 38 seconds.



"Hey, there it is! There it is! Son-of-a-Gun! Right down the middle of the road!!! Hey, it's targeted right for the centre of the crater. I can't believe it"

Bean, *"Amazing! Fantastic!"*

Conrad told Bean, *"I gotta get over to my right (north)"* and searched for a clear area just beyond the Snowman, skirting along the north rim of Surveyor Crater. He saw a suitable landing area between the Surveyor crater and Head Crater and wheeled around to his left to head for it. At 90 metres the rocket exhaust kicked up a raging dust storm and Conrad lost sight of the surface under the shooting bright streaks of dust blasting away from under their feet. To the astronauts the dust appeared to be flying to the horizon. Eyes glued to the instrument panel, occasionally flicking to look out the window, he had no idea whether there were threatening craters or boulders below, or not.

Intrepid homed in to a pinpoint landing on the target, Snowman and the Surveyor spacecraft. The blue contact light lit up; Bean announced, *"Contact light,"* and Conrad shut down the rocket motor. They dropped vertically to land with a solid thump about 6 metres from the edge of the Surveyor crater at 1654:36 AEST on Wednesday 19 November. They were only 163 metres from the Surveyor III spacecraft, which had landed previously on 20 April 1967.

An incredulous Conrad remembered how he had asked trajectory specialist Dave Reed to target Intrepid for the middle of the Surveyor crater, not really believing he could do it. Apollo 12 used a new computer program called a Lear Processor, named after its developer William Lear, to minimise navigational errors using three tracking stations on Earth to correct Intrepid's course as it passed by on its final orbit before landing, or it would have overshoot the target by an estimated 1,277 metres.

Once Intrepid was safely down, Bean reached out a gloved hand and clapped Conrad on the shoulder, *"Great landing, Pete. Outstanding, man."* Dick Gordon's voice broke through, *"Hello Intrepid – Congratulations from Yankee Clipper."*

"Thank you sir," replied Conrad, *"We'll see you in 32 hours."*

"Okay – have a ball."



Pete Conrad at the top of the ladder – photographed by Alan Bean through the hatch. Image: NASA

As they began to go through the post landing procedures Conrad confessed: *“I think did something I said I’d never do. I believe I shut that beauty off in the air before touchdown.”*

Capcom Jerry Carr in Houston: *“Shame on you!”*

Conrad: *“No, I was on the gauges. That’s the only way I could see where I was going. I saw that blue contact light, and I shut that baby down and we zipped in from about 6 feet (1.8 m).”*

Carr: *“Roger. Break Pete. The Air Force guys say that’s a typical Navy landing!”*

The two astronauts began to plough through the post-landing checklist, while Gordon, orbiting in

Yankee Clipper 96 kilometres above, searched through a 28 power telescope and spotted a speck of light with a shadow, then another speck nearby, about three hours after they landed:

Gordon, *“Houston, I have Snowman. And I believe I have the Surveyor (means the LM) on the northwest side of the Surveyor Crater.”*

Capcom Gibson, *“Clipper, Houston. We copy that.”*

Gordon, *“...and, Houston, it casts a shadow that looks like it’s about, oh...It’s hard to distinguish; it looks like about a third of a crater diameter just in front of it.”*



Alan Bean begins his climb down the ladder. Image: NASA

Listen to the start of the first EVA

As recorded at Honeysuckle. There's some crosstalk faintly audible on the tape.

The clip begins with Pete Conrad backing out of the hatch.

- 02'02" Headed out the door
- 02'28" Deploys the MESA
- 03'10" Pete sees the Surveyor Crater
- 03'56" Still at the top of the ladder.
Pete has trouble with the LEC
- 05'55" Heads down the ladder
- 06'29" Pete comes into the TV picture
- 06'51" He steps onto the pad
- 07'50" He spots Surveyor
- 10'00" Starts collecting the Contingency Sample
- 11'44" Al Bean remarks how far forward Pete has to lean



3.2MB mp3 runs for 12 minutes 42 seconds.



With the Sun 6.6° above the lunar horizon at this time, the LM's shadow was estimated to be 58 metres long.

Gordon: *"I have Intrepid! I have Intrepid!"*

FIRST EVA

"I can't wait to get outside – these rocks have been waiting four and a half billion years for us to come and grab them!" called an impatient Bean.

Conrad, *"Think so, huh?"*

Bean, *"Let's go grab a few."*

Conrad, *"We've got to get an ALSEP out first."*

They worked their way through the essential housekeeping procedures. Five and a half hours later, at 2132:35 AEST 19 November, with the Moon riding high just past Honeysuckle Creek's

zenith, Conrad emerged through the hatch and stood on the top of the LM's ladder.

Checking around he saw that they had landed about 9 metres from the Surveyor Crater rim. Elated, he leapt onto the Lunar Module's footpad with both feet:

"Whoopee! Man, that may have been a small step for Neil, but that's a long one for me!", he chuckled.

Nobody remembers second, let alone third, so his first words on the lunar surface were said voluntarily to win a bet with an Italian journalist, Oriana Fallaci, and to prove that Armstrong had not been pressured what to say by government officials.

Then, *"Boy, you'll never believe it. Guess what I see sitting on the side of the crater! The old Surveyor."*

Their visit to the Surveyor spacecraft would have to wait for the next day, as the first task was to lay out all the equipment for the science experiments, the first ALSEP (Apollo Lunar Surface Experiments Package). See the [ALSEP essay](#) for details.

The high spirited, exuberant Apollo 12 lunar excursions were a welcome contrast to the formal, tension filled, Apollo 11 lunar walk.

Alan Bean begins his climb down the ladder.

Conrad looked around for the Earth, and found it was up above them – they had to bend right back in their suits to see it.

Conrad: *"And the dust! Dust got into everything. You walked in a pair of little dust clouds kicked up around your feet. We were concerned about getting dust into the working parts of our spacesuits and the Lunar Module, so we elected to remain in our suits between our two EVA's."*

As they began to work on erecting the S-Band antenna Bean commented, *"I'm glad you didn't land back about 50 feet (15.2 metres on the inner slope of Surveyor Crater)."*

Conrad agreed, *"That's what I'm saying, buddy,"* and both laughed.

Watching Conrad loping around Bean said, *"Boy, you sure lean forward, Pete."*

Conrad, *"Hey, 'lean forward?' I feel like I'm going to fall over in any direction... ..Am I really leaning over, Al?"*

Bean, *"You sure are. On Earth, you'd fall over, I believe."*

Conrad, *"Huh?"*

Bean, *"On Earth, you'd fall over leaning that far forward."*

Conrad, *"It seems a little weird, I'll tell you. Don't think you're going to steam around here quite as fast as you thought you were."*

Conrad and Bean found walking around on the Moon no trouble, but it seemed easier to walk fast than slow. Bean reported that there was no such thing as 'walking' on the lunar surface, that you just wanted to go at a lope. It took more energy to move slowly and take a normal step than it did to lope. They didn't experience any slippery surfaces that the Apollo 11 astronauts reported.

Bean found running on the Moon was quite a new experience. "When I pushed off with my toes I thought I was taking long strides, but when I checked my footprints I found it was an illusion – they were about the same distance apart as they would be on Earth. I seemed to be floating along just above the surface. Although I could jump high, I couldn't run very fast because there wasn't the friction with the ground in the lighter gravity."

What would happen to an astronaut if he fell down on the moon in his space suit? This was one of the concerns of the mission planners, but Conrad and Bean found it was actually fun. Conrad was the first astronaut to be able to answer that question in the first astronaut news conference from space at 1029 AEST on 24 November during TEC:

Carr, "Pete, everybody's wondering about the fall you took on the Moon. Was it accidental or on purpose? And how did it feel to fall in the weak lunar gravity, and could you have recovered your footing if Al Bean hadn't been there to help you?"

Conrad, *"Yes. No, I was – I didn't fall on purpose. I was trying to pick up something, and I was just standing next to Al. It was a rock that was too big to go in the tongs and we sort of had a little game we played there of leaning on the tongs and sort*

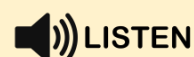
of doing a one-armed jabber-do (a Conrad one-arm push-up) all stretched out, and I just sort of rolled over on my side down there on the ground and Al, before I got all the way down, just gave me a shove back up again. I don't think it'll be any problem. The business of falling against a rock and cutting your suit or something; you don't fall that fast. You just wouldn't hit a rock hard enough, do you think, Al?"

Bean, *"No, not only that, you're talking about not falling fast: When you start to fall, and you lose your balance at first sort of quickly, particularly if you ever try to back up, because the ground is uneven and you step in holes or over rocks. You fall so slowly that it gives you plenty of time almost to turn around or catch your footing before you actually get low enough down before it's too late. I can re-call a number of times when I lost my balance. If I'd lost my balance that much on Earth, I would have probably fallen down. But on the Moon, because you start moving so slowly, you're usually able to spin around and bend your knees and recover. And, like you say, Pete, you're falling so slow that you can usually catch yourself or roll over or something."*

One of the big disappointments of the mission was the television camera breaking down after only 20 minutes. At 2220 AEST Bean removed the TV camera from the MESA and began to set it up on a tripod. Conrad looked around for the Earth, *"Where, oh where, is Earth?... ..There it is."*

Bean came over to him, *"Here is the TV. And it's pointing toward the Sun. That's bad. Point it here a minute."*

Where's the Earth?



40kb mp3 runs for 19 seconds.



Conrad was cheerful and humming to himself, *"Dum dee dum, dum dum dum."*

Capcom Ed Gibson, *"Al, we have a pretty bright image on the TV."*

At Honeysuckle Creek we were watching the antics of the camera as Bean placed it down on its tripod and then were horrified to see the picture whiteout before our eyes.

Nevil Eyre, duty video technician at Honeysuckle Creek described what he saw on his screen,

"I could see that Alan Bean was starting to point the TV camera at the sun, because it was getting very bright up in the top left corner of the screen – then I could see it starting to peel away from the left.... it was like somebody holding a sheet of paper and putting a match to it – no flames, just burning, rolling back in a boomerang shape and I wanted to scream at them to point the camera away from the sun."

Even the Capcom in Houston didn't know what was happening, the message wasn't getting to Bean. I heard the Capcom say, *"We're not seeing any picture, see if you can*

bump it," and Bean tapped it with his hammer. I knew that wasn't going to fix it – I knew exactly what had happened.

That was the end of any video pictures from the moon this mission."

'Pretty bright image on the TV'

As recorded at Honeysuckle.

Alan Bean tries to find what's wrong with the TV camera. (Answer: it had been pointed at the Sun.)



2.1MB mp3 runs for 18 minutes 06 seconds.



Picture digitally cleaned using AI

Nevil Eyre in the Honeysuckle Creek video section. This photo was taken during Apollo 17. Polaroid photo scanned by Ed von Renouard.



A view of Sydney Video during Apollo 12.

Preserved by Hamish Lindsay. Scanned by Colin Mackellar, Nov 2021.

This photo, published in *Goddard News* for 08 December 1969 shows the scene at Sydney Video, OTC (Overseas Telecommunications Commission) Paddington.

The view shows the team inside the small enclosed "NASA room" – and also many watching through the internal windows.

Deakin's Peter Trost is standing at left. NASA's Charlie Goodman is seated behind the operator in centre, and OTC's Wayne Ozarko is seated at right.

Through the windows, visible between Peter Trost and Charlie Goodman, is NASA Goddard Space Flight Center Public Affairs Head Ed Mason. Directly behind Charlie Goodman is OTC's Bob Goodman.

The rest of the lunar activities were followed from the Earth only with sound.

To us at the tracking station it was quite strange to only have black screens around, and the normally busy video section helping the telemetry technicians. Luckily the personalities of Conrad, with his infectious chuckles, 'Dum-de-dum dum's,' and Bean with his enthusiastic descriptions, entertained us as they whooped, hummed, joked,

and rollicked around, already quite at home in this alien new environment.

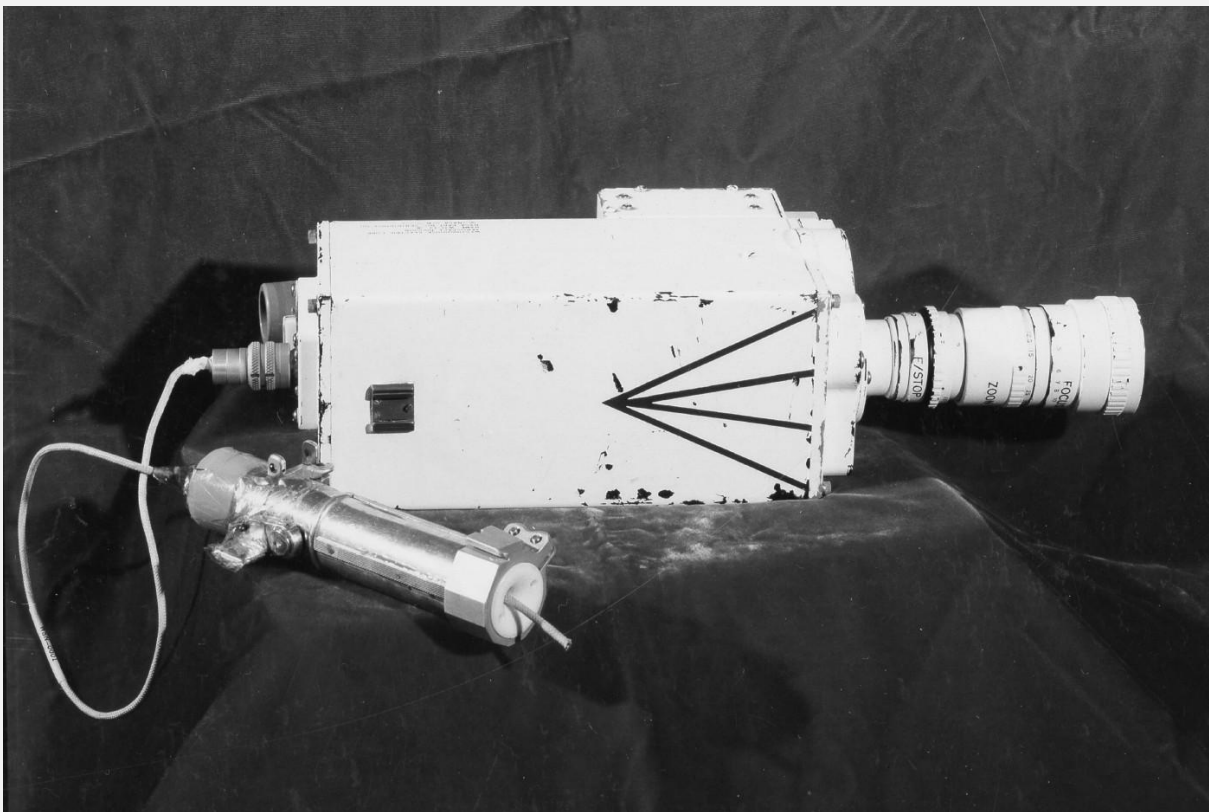
At 2235 AEST they pulled the stars and stripes out and set it up six minutes later, but nobody on Earth saw the patriotic moment when Conrad announced to the world, *"Okay, the flag is up."*

Gibson, *"Roger, copy. The flag is up."*

Conrad, *"We hope everyone down there is as proud of it as we are..."*



Alan Bean with the TV camera behind him. The erectable S-band antenna is pointing straight at Earth.
Image: NASA - AS12-46-6779



The Apollo 12 TV camera was returned to the Westinghouse Electric Corporation where it was confirmed that the problem was the camera had been pointed directly into the Sun – despite repeated instructions (apparently not passed onto the crew) that this would damage the camera.
Photo courtesy of Stan Lebar, Westinghouse Lunar TV Camera Program Manager.



The camera target, although damaged, still worked.
Photo courtesy of Stan Lebar, Westinghouse Lunar TV Camera Program Manager.

Conrad wanted a 'tourist' photo, "Al?"

Bean, "Yes, sir."

Conrad, "Can we have a quickie here?"

Conrad had to hold the flag out because, as you can see in the picture, the pin to hold the right-angle bracket had broken. Bean didn't want a picture with the flag.

At 2254 AEST they began to unload the ALSEP equipment and set it out. It took them over an hour to set it out, trying to keep from throwing dust over the equipment as they jogged past. Bean was amused by the care with which the ALSEP was assembled in the factory on Earth, only handled with gloved hands in a dust-free environment and here it was being jostled out and getting covered in black grime from the lunar surface.

There was no planned traverse for the first EVA, it was just collecting samples and to play the action in real time. The first EVA ended at 0128:38 AEST 20 November after an outing of 3 hours 56 minutes 3 seconds, as the Moon was sinking towards our horizon, and we were planning to hand the uplink over to Madrid. They had walked a distance of 1,006 metres and collected 16.7 kilograms of samples. Though their EVA was extended for 30 minutes, they still had plenty of consumables, such as oxygen, water and electrical power left – they could have stayed out for another two hours.

Conrad used the term "stuff" regularly in his conversations, so their chief training geologist, Uel Clanton, had an agreement that he would have to pay some of his colleagues a dollar each time Conrad said the word "stuff", during geologic descriptions. During the discussion with the ground after the EVA, Conrad let one slip,



Pete Conrad holds the US flag. Image: NASA

"Yeah. But don't we also want to get out here on this possible Copernican ray stuff?... ..Oops, excuse me, Uel Clanton, 'material'" – so he apologised for the slip.

The astronauts settled down to sleep at 0500 AEST (1300 spacecraft time in their afternoon) in their suits, in case there was a leak or malfunction in the LM environmental system during the sleep period, or they had to leave the Moon in a hurry. Although there was a 7-hour sleep period scheduled, neither astronaut took any sleeping pills nor managed to get any proper sleep.

Conrad, *"Okay. We're going Down Voice, Backup and Power Amplifier, Off, at this time and configuring for sleep."*

Capcom Weitz, *"Roger, Pete. Nighty-night."*

Conrad, *"Okay, and I understand 129:55 (Ground Elapsed time.) is reveille. Is that right?"*

Weitz, *"That's affirmative."*

Conrad, *"Okay. We'll gauge it on that. Nighty-night."*

"I was really tired by the time we went to sleep. I crashed and burned," Conrad admitted. He woke up after about 4½ hours suffering pains from a suit that was too short, "The suit was pressing on the bottom of my feet and my shoulders. It sounds funny, but bending your knees or anything you can't get rid of that. It was about one half inch too short. So, I beared with it most of the night." Conrad felt he was in a vice. He was desperate to get out so woke Bean up who retied the boots. Once awake they found it difficult to get back to sleep, so Conrad thought, "Screw it, let's go early."

"Dum dee dum, dum dum dum."

Charles 'Pete' Conrad Jr.



Pete Conrad with the ALSEP Lunar Surface Magnetometer. Image: NASA

SECOND EVA

At 1123:50 AEST 20 November Conrad called mission control, *"Hello, Houston; Intrepid. How are you this morning?"* though it was 1923 Houston time.

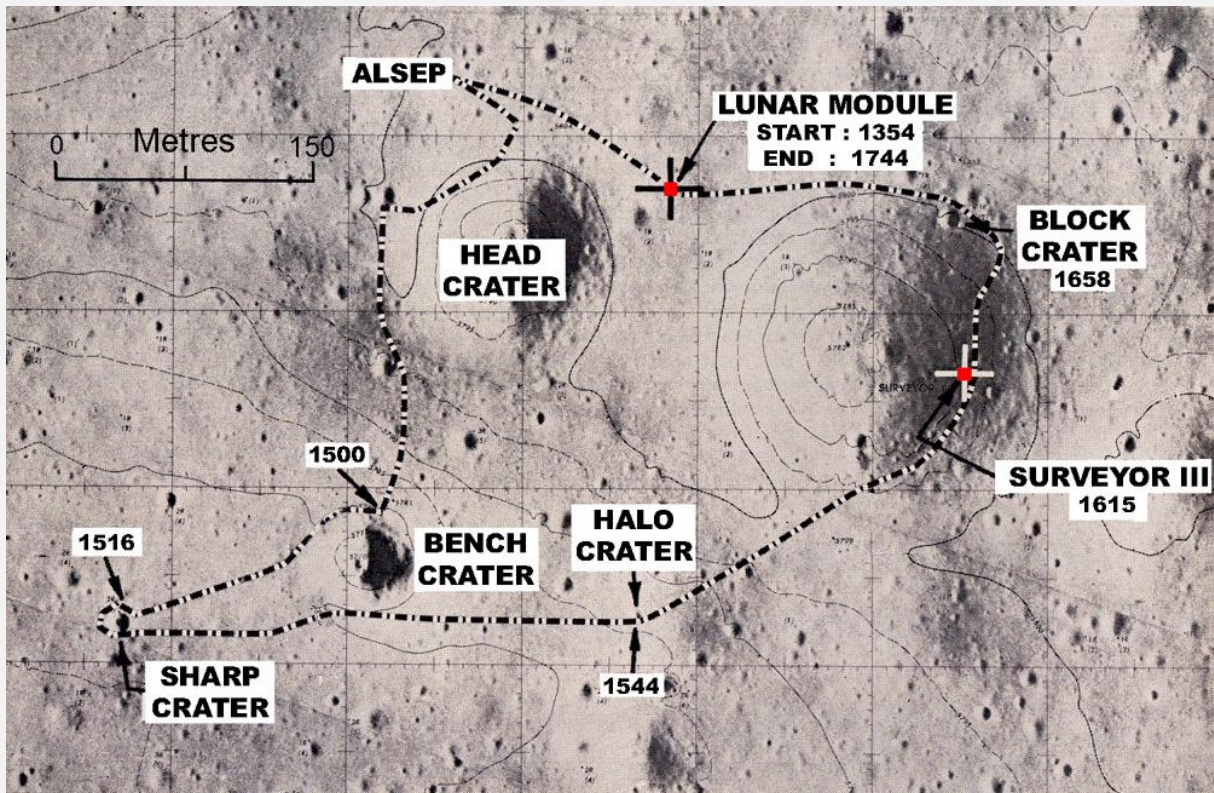
Weitz, *"Good morning, Intrepid. How did you sleep?"*

Conrad, *"Short, but sweet. We're hustling right now, and we're going to eat breakfast, have a little talk with you, and get about our business."*

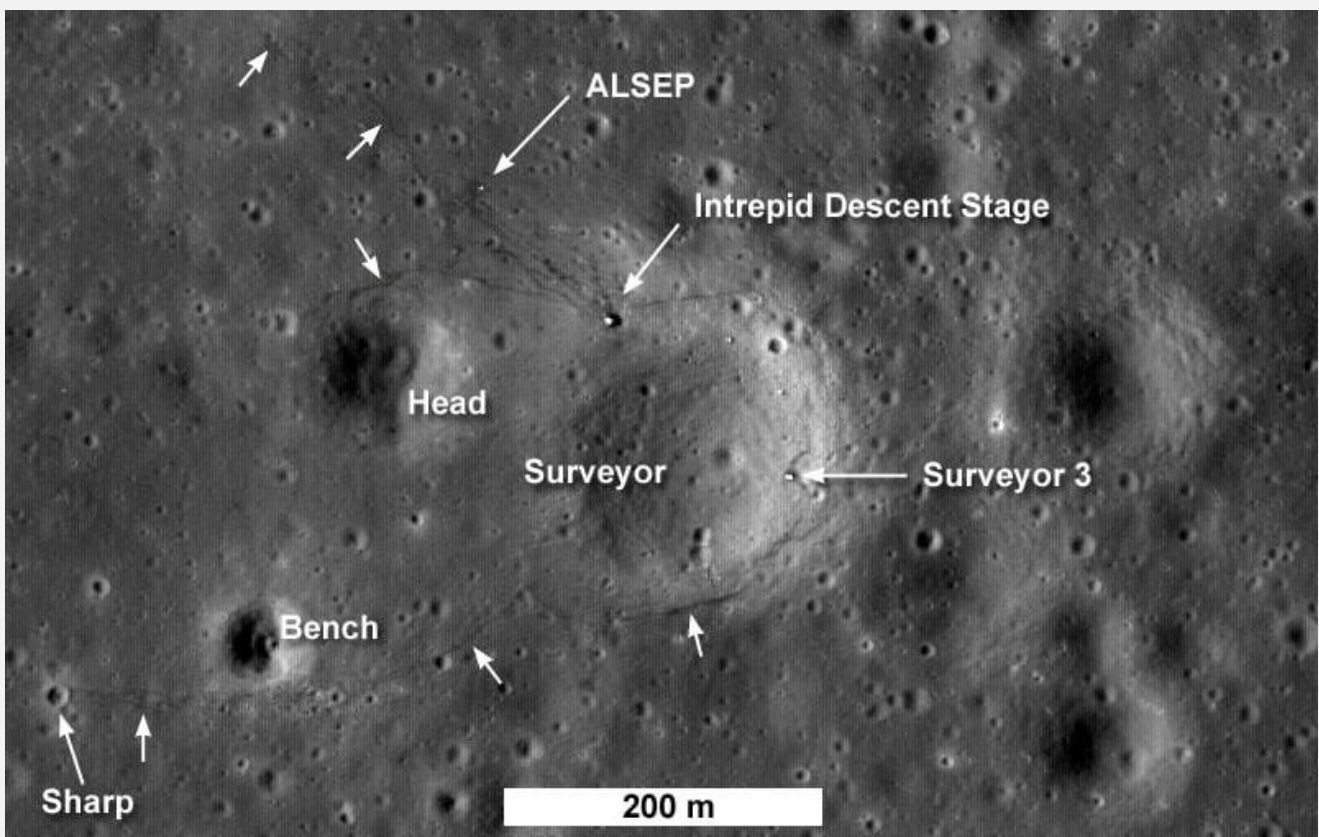
Weitz, *"Sounds good."*

The second EVA was going to be a little more scientific and the astronauts were to pick up samples and document them and take a core sample. The samples were identified by placing them in 13 pre-numbered Teflon bags.

During their training Conrad and Bean had developed a standard procedure for picking up samples. Conrad would point to a rock and put the gnomon near it. A gnomon is a vertical rod mounted in a three-legged stand. One of the legs has a colour chart and grey scale. When taking documentation photographs of the geology samples, they placed the gnomon in the field-of-view with the colour chart/grey scale in sunlight.



Traverse map of the Apollo 12 second EVA with Australian Eastern Standard times for 20 November 1969 noted at each station. Notations by Hamish Lindsay. Image: NASA S-69-59538 Map prepared by the Mapping Sciences Laboratory, Science & Applications Directorate, Manned Spacecraft Center.



Lunar Reconnaissance Observer image of the Apollo 12 landing site.

This image, taken from the LRO's 50km mapping orbit, was released in early November 2009. The sun angle makes the site look different, but the astronauts' tracks are clearly visible.

Image NASA/GSFC/Arizona State University.

The gnomon staff showed local vertical and also provided a length scale. Bean would take a stereo photo before Conrad would pick it up and put it in Bean's, or his own, sample bag.

When taking geological pictures with the cameras, they had to be careful not to get one of their shadows in the picture or kick any soil into the picture frame. Dirt kicked onto the surface in the picture gave a false impression of the original surface, covering the pristine soil and small impact pockmarks. Running along looking for interesting samples was more difficult than they thought it would be. Everything was covered in grey dust, making it all look the same, so they had to hold a sample right up to the faceplate of the helmet to see what the rock was really like.

Following a 12½ hour spell in the LM after the first day's activities, the two astronauts emerged from the tiny hatch about one and half hours ahead of schedule at 1354:45 AEST 20 November when Honeysuckle Creek still had the Moon about 15 minutes below the horizon.

As he clambered down the ladder Conrad cheerfully announced,

"Down to campus... ..Whoops, long step... ..Okay, Houston, Mark. I'm on the lunar surface."

The two astronauts noticed that the scene looked less dramatic now. Apollo 12 had the lowest sun angle of 5° of the Apollo missions and while they were resting inside the LM the shadows had shortened and the colours had shifted from a grey to warmer tan-grey. It now looked much easier to get to the Surveyor spacecraft.

Conrad visited the ALSEP site to check the SIDE experiment. He was impressed with the clear voice in his earphones, *"Boy, Houston. That Comm is super; it sounds like you're right inside my helmet."* At this point Goldstone was tracking while we were standing by for moonrise and AOS.

While waiting for Bean at the LM, Conrad offered to roll a grapefruit sized rock into Head Crater for the seismometer.

Conrad, *"Okay. I'm standing still. Houston, on my mark, gonna roll it..... Mark. It's starting down. Hit, hit, hit, hit. Now it's just rolling. Roll, roll, roll, still rolling."*

Capcom Harrison Schmitt, *"Roger, Pete. We've got some jiggles..."*

Conrad, *"You're going to get a big surprise when you look into this Head Crater, Al. It's a heck of a lot deeper than it looked."*

Bean, *"Every crater you come to and look in, you see the glass beads."*

At Head Crater Bean noticed that Conrad's boot prints revealed a lighter grey just under the surface, which had the geologists back on Earth on their toes, as they were looking for evidence of light coloured streaks that may have been ejected from the large crater Copernicus, 370 kilometres to the north.

The geologists wanted the astronauts to collect samples at five specific points on this traverse. To achieve this, they had to keep moving and not spend time on stopping between points to look at interesting features. They found they could easily have spent hours at interesting points along the way.

BENCH CRATER

At 1500 AEST Conrad arrived at Bench Crater,

"Okay, Houston, I'm coming up on Bench Crater right now. I loped off and left Al. And I'll get you a pan in Bench Crater. This looks like a very interesting crater; it's different. Oh, and I see some really different rocks. A big one... ..Hey, that looks like bedrock. Gee, what a crater!... ..Oh, boy!... ..Hey, Al, look at... ..Come on over here!"

Bench Crater looked very steep sided, and the two astronauts stood on the rim looking into the bottom. Though they would have loved to climb down into it, they decided that they would need the tether rope to get back up, and it seemed too short. They decided that some of the bedrock was lying on the rim of the crater where they were standing, so scooped some of it up, but both laughed at the antics required to scoop it into the sample bag.

Bean, *"You've got to get some control there, babe. You're overpowering it. This one-sixth g up here, Houston... You lift something up in your scoop; and, when you stop the scoop, it (the sample) just keeps going up in the air."*



Bryan Sullivan (left) and Frank Hain at the Honeysuckle Creek computer consoles during Apollo 12.
Image reproduced from honeysucklecreek.net

SHARP CRATER

Bean, *"Okay, Pete, what is your next pleasure?"*

Conrad, *"I don't know. What do you think, Houston?"*

Gibson, *"You're looking in good shape. You can press on along the traverse over to Sharp Crater."*

After some difficulty finding Sharp Crater due to the flat lighting looking directly away from the Sun they arrived on its rim at 1516 AEST.

Bean, *"It's got a nice, raised rim on it."*

Conrad, *"Yeah. Look at that!"*

Bean, *"It's raised up about, what'd you say, 2 feet (0.6 metre)?"*

They found the crater's rim was very soft. Close by the rim they took photos, dug a trench and drilled for core samples. Unlike later missions, they found the core samples were easy to sink into the surface. Strangely, all the way back in Houston listeners could hear Bean hammering the core sample through his gloved hand, which vibrated the oxygen in the space suit and was picked up by the microphone.

HALO CRATER

Gibson, *"Okay, Pete. We will give you a radar vector on this one. If you will go over just directly east of Bench Crater; and you can continue on east until you are just about directly opposite the LM. And then a couple of more steps ought to take you right to Halo Crater."*

Conrad, *"Sounds like a pretty good vector. That also says that we are running right into the Sun. Does that agree with you?"*

Gibson, *"That's affirmative. You will be running right into the Sun. And directly at your 9 o'clock position, you will see the LM. And then a couple of more steps and you'll be right there."*

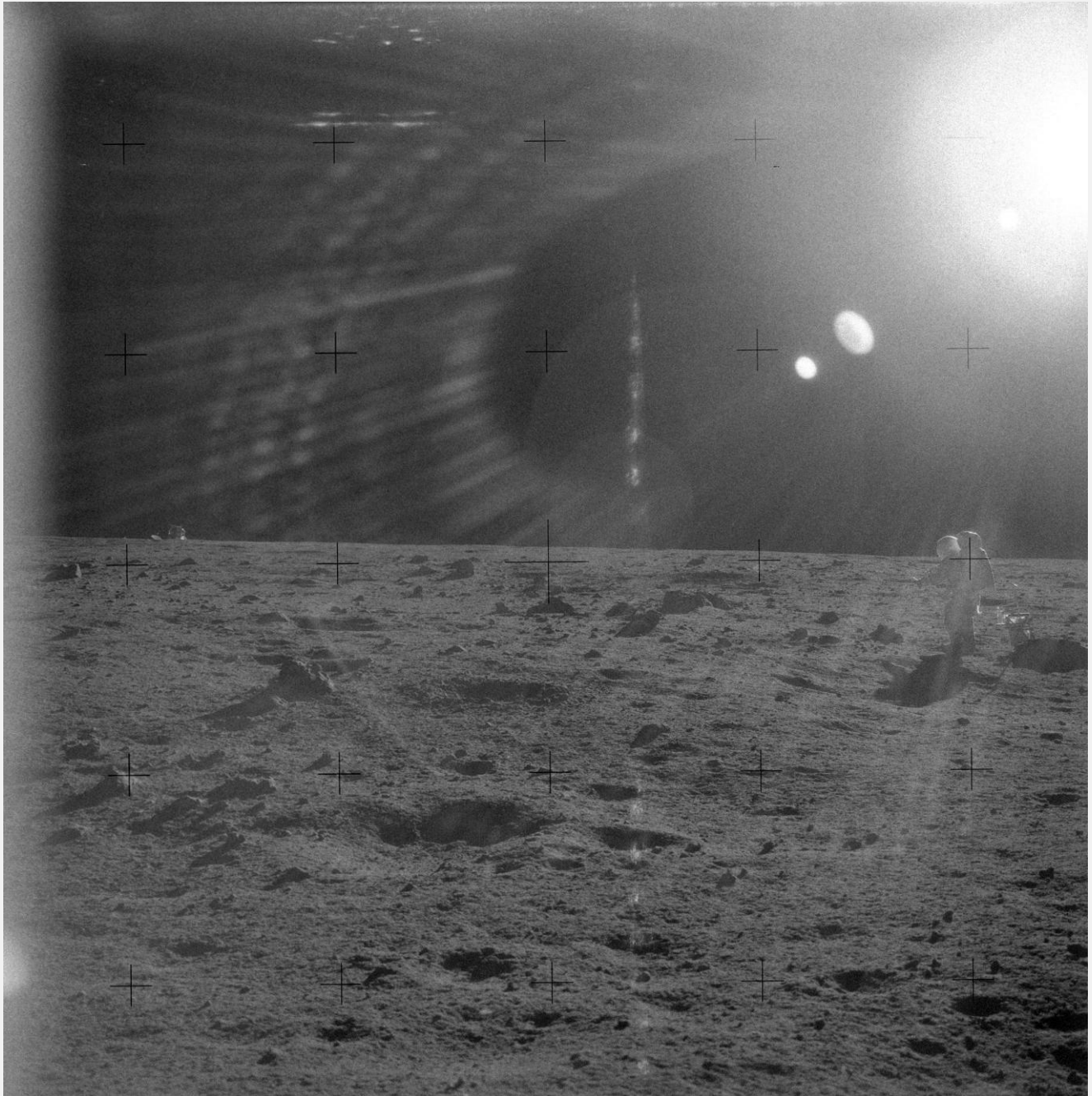
Conrad, *"I've got the LM in sight to my 10 o'clock... You know what I feel like, Al?"*

Bean, *"What?"*

Conrad, *"Did you ever see those pictures of giraffes running in slow motion?"*

Bean, *"That's about right."*

Conrad, *"That's exactly what I feel like."*



Alan Bean and glare from the Sun at Sharp Crater. The LM is at left on the horizon. Image: NASA

Then a voice from far-away Texas brought them back to reality,

“Say, would you giraffes give us some comment on your boot penetration as you move across there – what you’re doing now, and what you had back there at Sharp Crater?”

Conrad, *“Oh, it’s much firmer here. We don’t sink in (sic) anywheres near as much. Now I’m crossing some of my own tracks.”*

Bean added, *“Yeah. The toes sink in a bit, Pete, as you push off. You land flat-footed, so your heels don’t sink in; but, as you push off with your toes, they sink in down about 3 inches. Your heels are only sunk in perhaps an eighth of an inch.”*

Turning to run eastwards towards Halo Crater, the pair found that the low sun in their faces hurt their eyeballs. The blinding light washed out their vision so they could not see where they were putting their feet. They feared they might stumble into a deep hole. To avoid the light, they found it was better to tack like a sailing yacht towards their destination. Later missions added a sun visor to the helmets. These earlier space suits were harder to run in, and Conrad and Bean could only reach a maximum speed of 4 kilometres per hour. In later missions the astronauts could run up to 5.4 kilometres per hour. They also found that their mouths dried out with heavy breathing and inhaling pure oxygen, making them long for a



Alan Bean hammering a core sample tube. Image: NASA

Al Bean is hammering a double core tube at a geology stop near Halo Crater. He has driven in all of the lower section and most of the upper by this time. The crater beyond the core tube is not Halo.

Note that he is using the flat of the hammer. Because of the stiffness of the suit, it is difficult to control the swing and, by using the flat, he is more certain of actually hitting the top of the extension handle.

Al is wearing a 'saddlebag' on his left hip. We can see good detail of Al's camera handle and trigger which, unbeknownst to the crew, has started to come loose.

good drink of water. Future space suits designed for the longer EVA's using the Lunar Rover had a system for drinking liquids through a straw incorporated into the space suit.

The pair passed to the south of Bench Crater arriving at Halo Crater at 1544 AEST.

Gibson, *"Pete, the dimension on Halo crater is about 20 feet, so that would make it half of what you saw at Sharp."*

Conrad, *"Okay. Well, Halo...I wonder if I'm standing...You suppose this is it, Al?"*

Bean, "Well, it doesn't have any halo around it."

Conrad, "Yeah, I know. But you never can tell from here (from the surface)."

The two noticed that the surface around them had a raindrop pattern almost everywhere they went, probably the result of micrometeorite bombardment.

Bean, "It's funny though. If you saw this on Earth, you would think it was a real soft dirt that it had just been rained on recently. Not hard rain, but just a sprinkle."

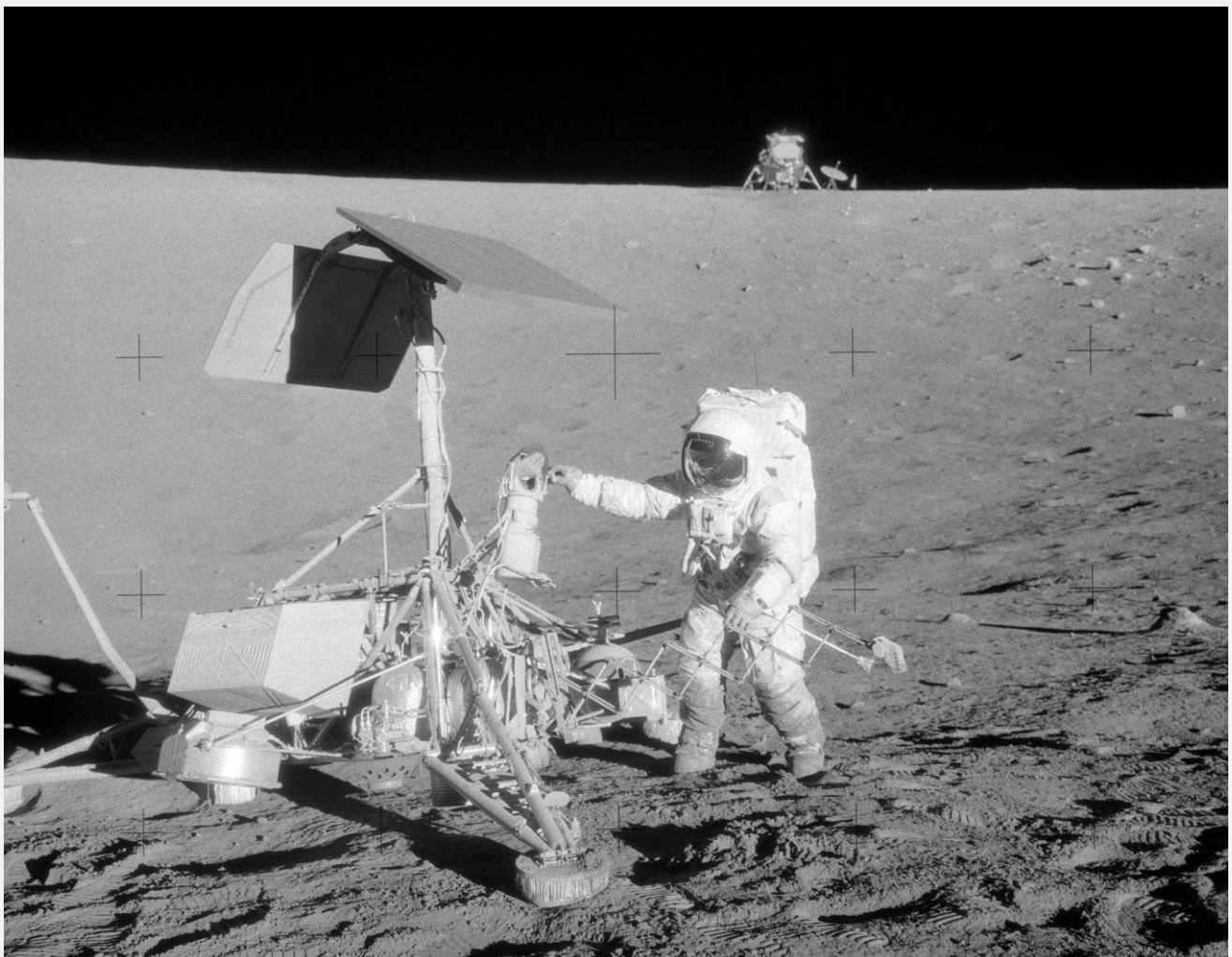
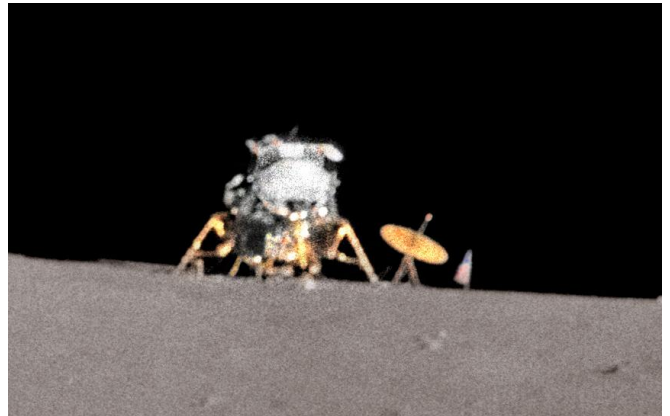
Conrad, "Okay, Houston. What else would you like here?"

Gibson, "Okay, Pete. You're 2 hours and 7 minutes into the EVA. And we show you leaving Halo at around 2:15. And now, that's for a 4-hour EVA. We've extended you to 30 minutes for a total EVA of 4 hours. We'd like, before you go on, to have a good EMU check and sit down and regroup and figure out a plan of attack on the Surveyor.

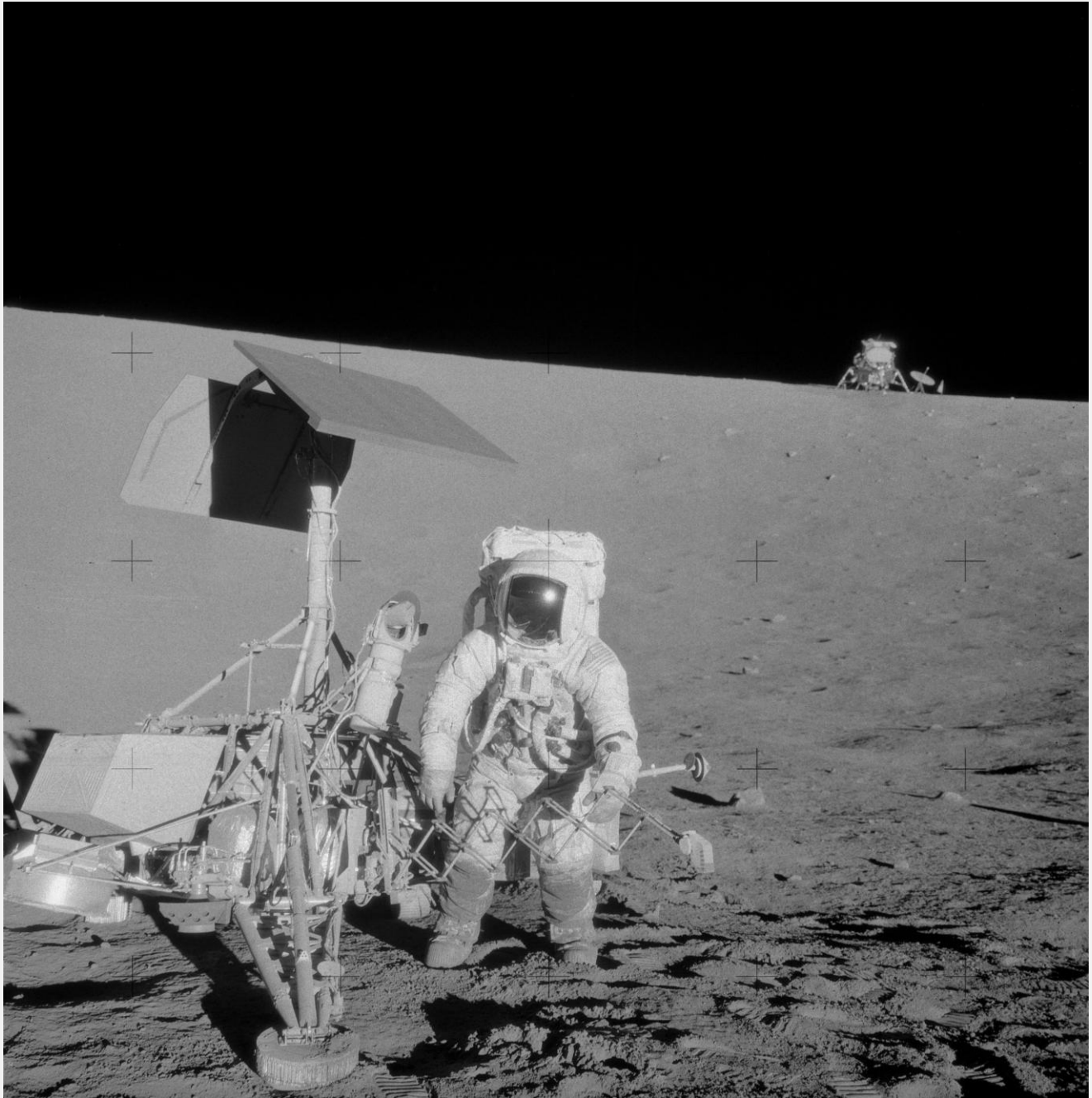
One thing we would like to make sure is that you remain away from directly below the Surveyor as you move up to it. That is, move up to it on one side or the other. Either north or south."

Conrad, "Okay. We concurred with that. We were talking about it last night. We're going to approach it from the side."

This instruction was given in case the Surveyor spacecraft was disturbed and slipped down the slope on top of the astronauts.



Pete Conrad with Surveyor III. Lunar Module Intrepid on the crater rim (coloured inset above). Image: NASA



Alan Bean with Surveyor III. Lunar Module Intrepid visible on the crater rim. Image: NASA

SURVEYOR CRATER

Conrad, *"Al, what I think we can do is walk down here about 300 feet (90 metres east along the rim) and walk straight down that slope to it."*

Bean, *"I do, too. It doesn't look so bad from here, does it, Pete?"*

Conrad, *"Uh-huh."*

The two astronauts walked cautiously down the slope at an angle towards the Surveyor spacecraft, arriving at 1615 AEST.

Conrad spoke to Bean, *"Al, I'll tell you what; let's do. Get right over here, and we'll park all of our*

gear, take ourselves a little rest, go over your photo plan, and then we'll have at it."

From what they could see there was little change to the Surveyor since it landed 31 months ago. They noticed its colour was a light tan instead of white. As they puzzled over where this tan colour had come from, the soil around being grey, Houston threw in:

"Hey, Pete, do you think there is a chance you are at the wrong Surveyor!!?"

Replied Conrad, *"No, sir."*

Bean, *"Boy! It sure dug in the ground, didn't it? Oh, look at those pad marks! They're still there."*

The two friends had planned to set up a mechanical spring timer on the Hasselblad camera and take pictures of both of them posing with the Surveyor. Conrad was dying to be asked, "So who took the picture?" Before launch he had managed to smuggle the timer on board in his space suit and dropped it into the Hand Tool Carrier as they set off for the EVA.

Conrad, "Our big problem was finding this timer that I had gone out and purchased in a camera store. And had remembered to put it in my flight suit – in my right flight suit front pocket – on launch morning so nobody knew I had it. We put it in the command module, and we remembered to transfer it to the LM and remembered to transfer it to the lunar surface, and we did all of that and then we couldn't find it. It was absolutely in the very bottom of the HTC (Hand Tool Carrier) bag. Which is now totally full of rocks and sample bags."

When emptying the Hand Carrier back at the LM, the timer fell out from under all the rocks and samples, but by then it was too late.

Later Conrad wrote:

"The Surveyor was coated with a coating of fine dust, and it looked tan, or even brown, in the lunar light, instead of the glistening white that it was when it left Earth. It was decided later that the dust was kicked up by our descent onto the surface, even though we were 183 metres away.

We cut samples of the aluminium tubing, which seemed more brittle than the same material on Earth, and some electrical cables. Their insulation seemed to have gotten dry, hard, and brittle. We managed to break off a piece of glass, and we unbolted the TV camera. Then Al suggested we cut off and take back the sampling scoop, and so we added that to the collection."

BLOCK CRATER

Conrad, "Okay, let's head for (sic) Blocky Crater."

As they set off for Block Crater and headed up the slope they noticed that it took a lot more effort to walk than on flat ground.

Bean called after Conrad, "Can't get up your pace when you're running on the side of a slope."

"You couldn't bounce from side to side and spring off your feet like you could on level ground." explained Bean. They never felt there

was any danger of slipping down to the bottom of the crater.

They arrived at Block Crater at 1658 AEST

Bean, "That's got to be bedrock there, babe."

Bean studied the crater, "The original crater (meaning Surveyor Crater) took it down to bedrock and then, I guess, more recently then, this one came in here and really banged it out. These blocks are a lot more sharp-cornered than any we've seen anywhere else. I guess this must be the most recent one we've been around."

It looked as though the more recent Block Crater impact then dug through that accumulation and re-exposed pieces of the bedrock.

They left Block Crater at 1706 AEST, Conrad charging ahead of Bean to arrive back at the LM a minute or so later. Bean was getting really tired carrying the sample bag, now full of rocks and dirt.

Conrad, "This is really ridiculous. I got dust all over the rock box, and I'm trying to blow it off."

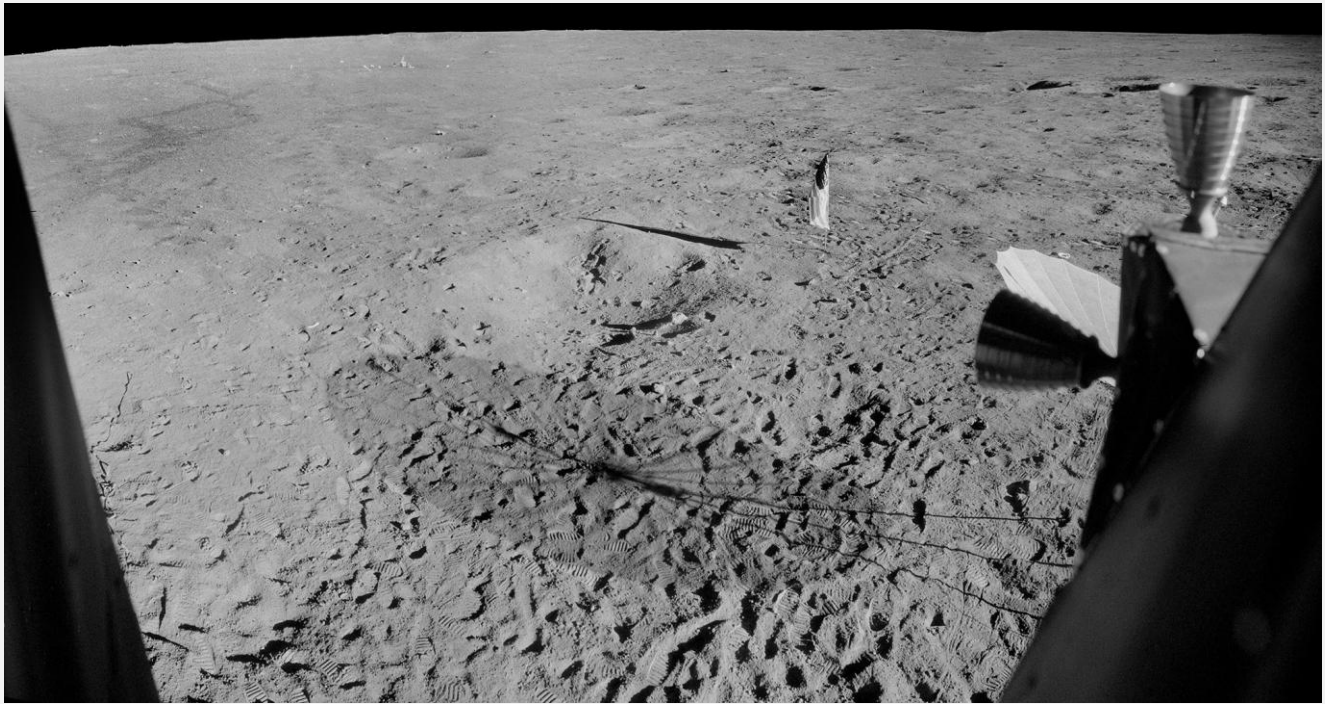
Without thinking Conrad had tried to blow the dust off the rock boxes, but, of course, it had no effect with the helmet on.

While waiting for Bean to hoist the samples up, Conrad said: "I feel just like a guy at a shopping centre with the groceries, waiting for his wife."

After stowing their rock collections, they attempted to clean up the clinging lunar dust, "Man, are we filthy. We need a whisk broom," complained Conrad, frustrated with the impossible task of cleaning up the clinging lunar dust.

The second EVA ended at 1744 AEST giving an excursion time of 3 hours 49 minutes 15 seconds. This time they walked a distance of 1311 metres and collected 17.6 kilograms of samples. At the end of the stay the total time outside the LM was 7 hours 45 minutes 18 seconds and the farthest distance travelled from the LM was 411.5 metres.

Sitting on the floor of the LM, Conrad was quite exhausted – and frustrated. They still had a couple of hours of consumables in their backpacks, and here they were just killing time in the LM for two hours, literally doing nothing, when they could have been out doing more exploring. So, after a leisurely lunch they went thoroughly through the checklist for lift-off.



View from inside the Lunar Module Intrepid. The shadow of the S-band antenna is in the foreground. The US flag is visible upper-middle. The ALSEP equipment is visible in the upper-left. Image: NASA

LUNAR LAUNCH

At 0025:47 AEST 21 November the ascent stage of the Lunar Module blasted off for the second copybook launch from the Moon's surface.

As they were shooting up to enter orbit Conrad offered his friend Bean the controls of the Lunar Module.

Bean:

"Pete said to me you're working too hard, go ahead and look out the window, so I looked out the window, and then he said, 'Would you like to fly the LM?'" and I said 'Well, yeah I'd love to.'

I grabbed the controls (Bean had a set the same as Conrad) but before I moved them I said, 'We don't want to get off course.' We had a program that measured velocity in every direction, so Pete said, 'Let's call up that program.' Well, of course it read zero because that's where it starts. Then I knew if I flew two feet per second left that it would measure it, then after I had finished flying around for a few minutes then I could thrust all those reading back to zero, and we would be right back on course again. I started to fly the LM then I said 'The people in Mission Control aren't going to like this – they would notice the thrusters were firing, and they would be wondering why they were firing, and they could also tell it was my hand controller. They

might think there was a failure. Pete said 'Well, we're over on the backside of the Moon, they won't know a thing about it.' Of course they would know, because everything is recorded on the tape recorder. I'm sure they discovered it later, but it didn't make any difference.

After talking to other people, as far as I know, I was the only LM pilot that got to fly the LM. That just shows how special Pete was."

Bean will always be grateful to Conrad for his thoughtfulness.

Intrepid went on to meet Yankee Clipper at 0358:20 AEST. A very happy Gordon was waiting to welcome his mates. When Gordon opened the hatch and saw the two grimy moonwalkers covered in clouds of lunar dust about to invade his spacecraft, he slammed the hatch with, "*You guys ain't gonna mess up my nice clean spacecraft.*" Conrad and Bean had to undress and clean up before being allowed to enter the Yankee Clipper, naked.

The LM was jettisoned at 0621:31 AEST.

This was the first time the ascent stage of the Lunar Module was driven into the lunar surface to exercise the ALSEP seismometers. Smashing itself to smithereens at 0817:17 AEST at 6,012 kilometres per hour, 72 kilometres from the Apollo 12 ALSEP seismometer, the geophysicists

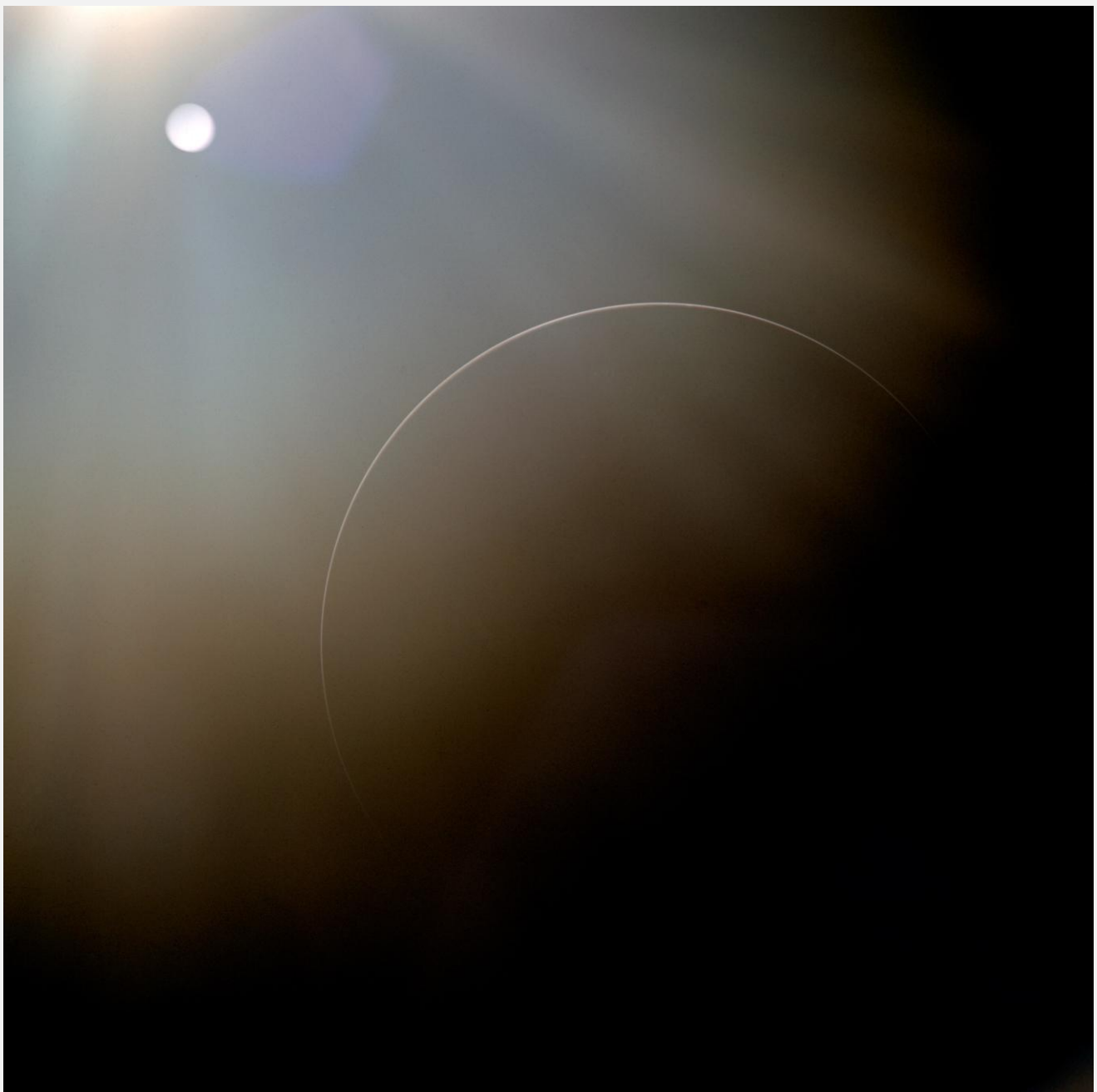
stared at their readouts in growing astonishment as the shock waves built up to a peak at 8 minutes and died away over a period of 55 minutes. On Earth the same impact would have lasted about two minutes.

Dr. Maurice Ewing of Columbia University's Lamont Observatory exclaimed, *"It was as though one had struck a bell in a church belfry a single blow and its reverberation had continued for 55 minutes."*

This strange phenomenon was repeated with every heavy impact in subsequent missions on all the seismometers.

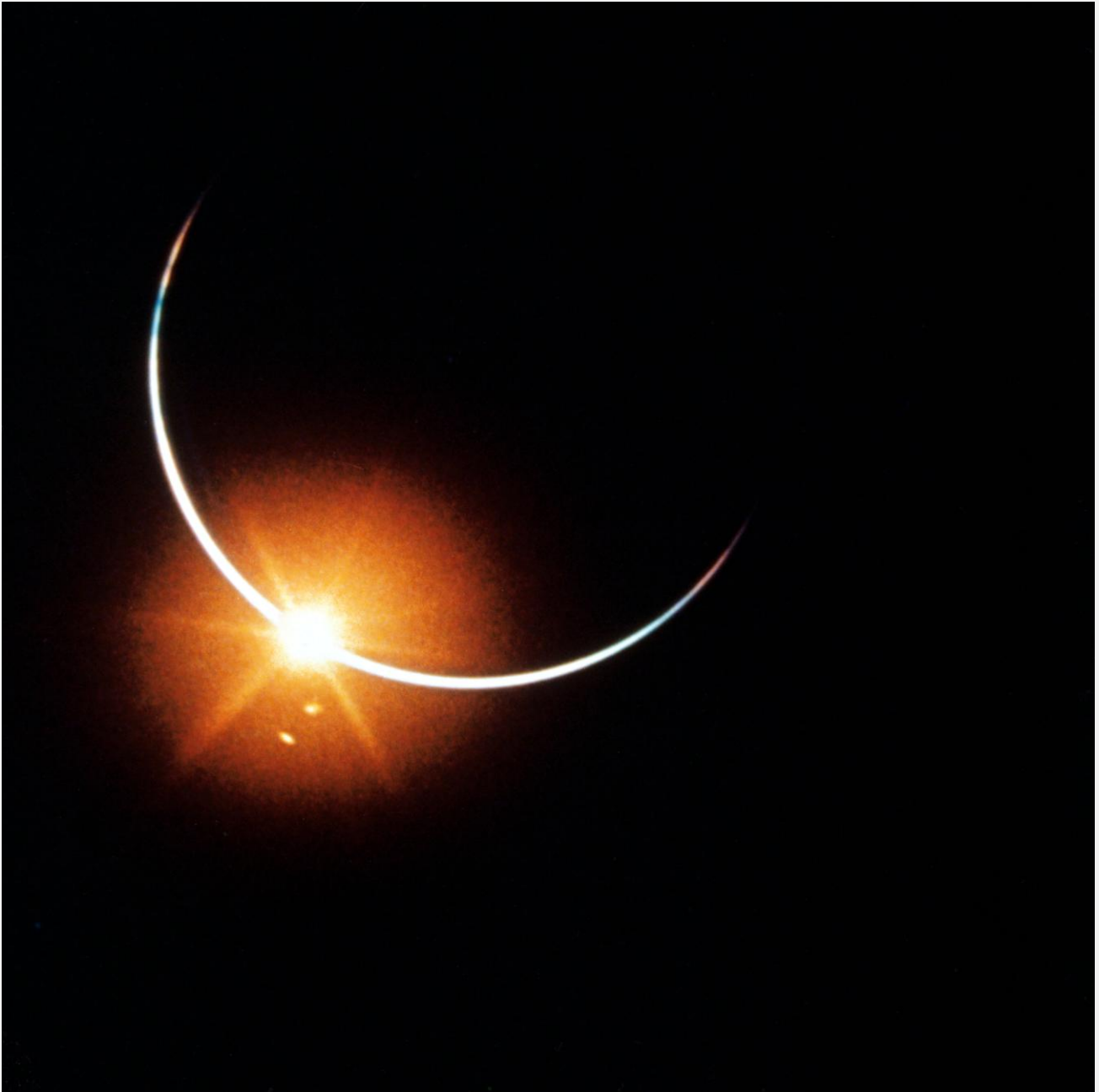
The impact of Apollo 13's heavier Saturn IVB reverberated up to 4 hours. An explanation for this phenomenon is provided by Dr. Ross Taylor, Professorial Fellow at the Research School of Earth Sciences at the Australian National University, Canberra:

"This is attributed to the extremely dry nature of the lunar rocks. There is no moisture on the Moon, and nothing to damp out these vibrations. The Moon's surface is covered with rubble, and this just transmits these waves without them being damped out in any way as they are on Earth. So, they just ran around the Moon."



The crescent Earth is illuminated by the Sun.

Image: NASA



The Earth eclipsing the Sun from Apollo 12.
Image: NASA

FIRST EVER WITNESSES TO THE ECLIPSE OF THE SUN BY THE EARTH

At 0255 AEST 25 November, towards the end of the return journey, the Apollo 12 astronauts were witness to the first ever eclipse of the sun by the Earth. They were 48,350 kilometres from Earth travelling at 12,112.9 kilometres per hour. The Sun went behind the western limb of the Earth in the Northern hemisphere and reappeared on the eastern limb, still in the northern hemisphere. The three astronauts watched a thin sliver of sun behind the dark mass of the moonlit Earth and took the first photographs of the Earth's atmosphere backed by the sun.

Bean, "Funny thing is, you cannot see the Earth at all when you just shield your hand from the Sun and look out right next to it where the Earth should be. It's not there at all. When you stick your smoked glass up, you can see where it's cutting the – the Sun. Otherwise, it's completely invisible."

Bean, "Fantastic sight. What we see now is – The Sun is almost completely eclipsed now, and what it's done is illuminated the entire atmosphere all the way around the Earth, even though the Sun is still on what looks like the western limb of the Moon – the Earth to us."

Capcom Weitz, "Roger. Understand you cannot make out the Earth at all."

Bean, "No. You can't see any features on it. All you can see is this sort of purple-blue, orange, some shades of violet, completely around the Earth. It's illuminated."

Bean, "This has got to be the most spectacular sight of the whole flight. We can see now that the Sun's behind the Earth. We can see clouds sort of on the dark part of the Earth; and, of course, the Earth's still defined by this thin narrow – or thin blue-and-red segmented band. It's a little bit thicker over at the – down where the Sun just set than it is at the other one, but it is really a fantastic sight. The clouds appear sort of pinkish grey, and they're sort of scattered all the way around the Earth. It would be interesting to know exactly what part of the Earth we're looking at or what our nadir is now, because that part doesn't appear to have any clouds, and these others appear to be sort of revolving around it."

Weitz, "Roger, Al. Understand that you can see clouds all the way around the Earth including the dark portion of it, and your nadir right now is just about the Indian Ocean."

The dark side of the Earth was laced with lightning flashes along the equator and the specular light of

the full moon behind them gleamed off the black oceans. Alan Bean decided it was the most spectacular view of the whole flight.

Conrad, "Houston, 12. We – we're better night-adapted now, and by golly, we can see India, and we can see the Red Sea, and we can see the Indian Ocean quite easily. It's amazing how well we can see, for that matter. We can see Burma and the clouds going around the coastline of Burma, and we can see Africa and the Gulf of Aqaba; it looks like the same photograph Dick and I took on [Gemini] 11. We can also distinguish the lights of large towns with our naked eye."

Conrad continued, "It's – Venus is just below the Earth, and we can see Venus quite clearly, well, you can see all kinds of stars, but Venus is just below the Earth. This is – this is really a sight to behold, to see it at night time like this."

Conrad ended the eclipse with, "We're – Al – Al – we rolled so Al could take the sunrise pictures, and the Sun has pretty well wiped out that view that we had. Now the Sun's started up, and the Earth has turned black again."



Alan Bean is helped out of the spacecraft.
Image: NASA



SPLASHDOWN

After a Trans-Earth Coast period of 71 hours 52 minutes and 52 seconds, at 0658:25 AEST 25 November Apollo 12 landed in a rough Pacific Ocean, 7.2 kilometres from the carrier USS Hornet. Bean was standing by to quickly punch two circuit breakers to cast off the parachutes before they were pulled over upside down. The Command Module hit the sea with such a jolt, estimated to be 15g's, Bean felt momentarily dizzy, although he heard Gordon call out, *"Hey Al, hit the breakers,"* as they began to turn over.

Gordon queried, *"Al, what happened?"*

"Nothing happened, what are you talking about?"

"You're bleeding," Conrad was looking at a gash above Bean's eye where the 16mm movie camera had broken loose and struck Bean above his eye.

A surprised Bean told his companions, *"It must have knocked me out for a few seconds, and I didn't even know it."*

After a welcome on the Hornet, Bean required two stitches in the sick bay before the astronauts were taken to the Lunar Receiving Laboratory for their eleven days, and the second mission to the Moon's surface was safely over.

Apollo 12 had proved the navigation systems were accurate enough to land exactly on the chosen spot, the hardware systems, including the ALSEP, were good enough to support the requirements of the mission, and the astronauts were able to do useful work in a lunar environment.

With such a string of spectacularly successful lunar missions, and now two landings, flying to the Moon was turning out to be a pretty straightforward business as far as we (at Honeysuckle and Tidbinbilla) were concerned.

None of us were prepared for the shock that was in store for us with the next mission – Apollo 13 – when we would really be put to the test.

Essay by Hamish Lindsay.

Images, illustrations and captions by Hamish Lindsay and Colin Mackellar. Unless specified, audio recorded by Bernard Scrivener, digitised by Mike Dinn, edited and encoded by Colin Mackellar. PDF formatted by Glen Nagle.

© www.honeysucklecreek.net 2026

References

The Web:

The Apollo Lunar Surface Journal
edited by Eric Jones, selected quotes used
with permission.

The Apollo 12 Flight Journal
edited by David Woods, selected quotes used
with permission.

Personal interviews with:

Pete Conrad, Alan Bean
Chris Kraft, Gene Kranz
John Aaron, and Nevil Eyre

Books and periodicals:

Flight by Chris Kraft

Failure is not an Option by Gene Kranz

Apollo: The Definitive Sourcebook
by Richard Orloff & David Harland

Apollo EECOM by Sy Liebergot

Deke by Deke Slayton w/ Michael Cassutt

To a Rocky Moon by Don Wilhelms

Apollo Expeditions to the Moon
by Edgar Cortright

Aviation Week & Space Technology,
24 Nov. 1969, 1 Dec. 1969, 8 Dec. 1969





ABOUT THE AUTHOR



Hamish Lindsay (1937-2022) worked at the Muecha, 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*.

