MUCHEA

AND PROJECT MERCURY

an essay by

HAMISH LINDSAY

"…the worth of the Mercury Network was already proven in the MA-4 and MA-5 flights. However, the tremendous performance of the Network during John Glenn's flight far exceeded every expectation any of us had."

Chris Kraft, Mercury Flight Director

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Extracted from content available on the
Honeysuckle Creek Tracking Station
website, developed by Colin Mackellar

www.honeysucklecreek.net

Click or scan the QR code below to see the website's
Muchea Tracking Station section.

THE MUCHEA TRACKING STATION

Right to left: WWV time standard tower, Boresight tower, two Acq. Aid receiving antennas, and T&C Building.

Muchea Fact Box

Opened
Friday, 24 March 1961

Installation
Telemetry and Control building
Security caravan
Powerhouse
Amenities block
Water bore and tank

Antennas
Quad-Helix Acquisition Aids x2 (receivers)
Quad Helix Ground to Air x1 (transmitter)
VERLORT trailer and radar dish
Boresight towers

Missions supported
Mercury-Atlas (MA)

MA-4	13 September 1961	unmanned
MA-5	29 November 1961	Enos
MA-6	20 February 1962	John Glenn
MA-7	24 May 1962	Scott Carpenter
MA-8	3 October 1962	Walter Schirra
MA-9	15-16 May 1963	Gordon Cooper

Closed
Friday, 28 February 1964

EDITORIAL NOTES

This description of the Muchea Tracking Station comes from essays and content on the honeysucklecreek.net website, which is regularly updated with new content, including additions to the subject matter of this essay.

Indented & italicised quotes includes comments, interviews and air-to-ground communications.

- ONLINE CONTENT -
AUDIO – VIDEO – WEBSITE

This essay contains additional content which includes audio, video and website material, available via the internet. Click the icons or scan the QR code using your phone or tablet.

An internet connection is required.

LISTEN WATCH WEBSITE	Click these icons for a direct link to the online audio and video files, website or webpage content.
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The Telemetry and Control (T&C) building with the security caravan in the foreground.
Behind the building are the Acquisition Aid (Acq Aid) quad helix antennas. Photo: Hamish Lindsay

Muchea Tracking Station

In 1961, the first Australian NASA station to track the original American Project Mercury astronauts into space was opened for business.

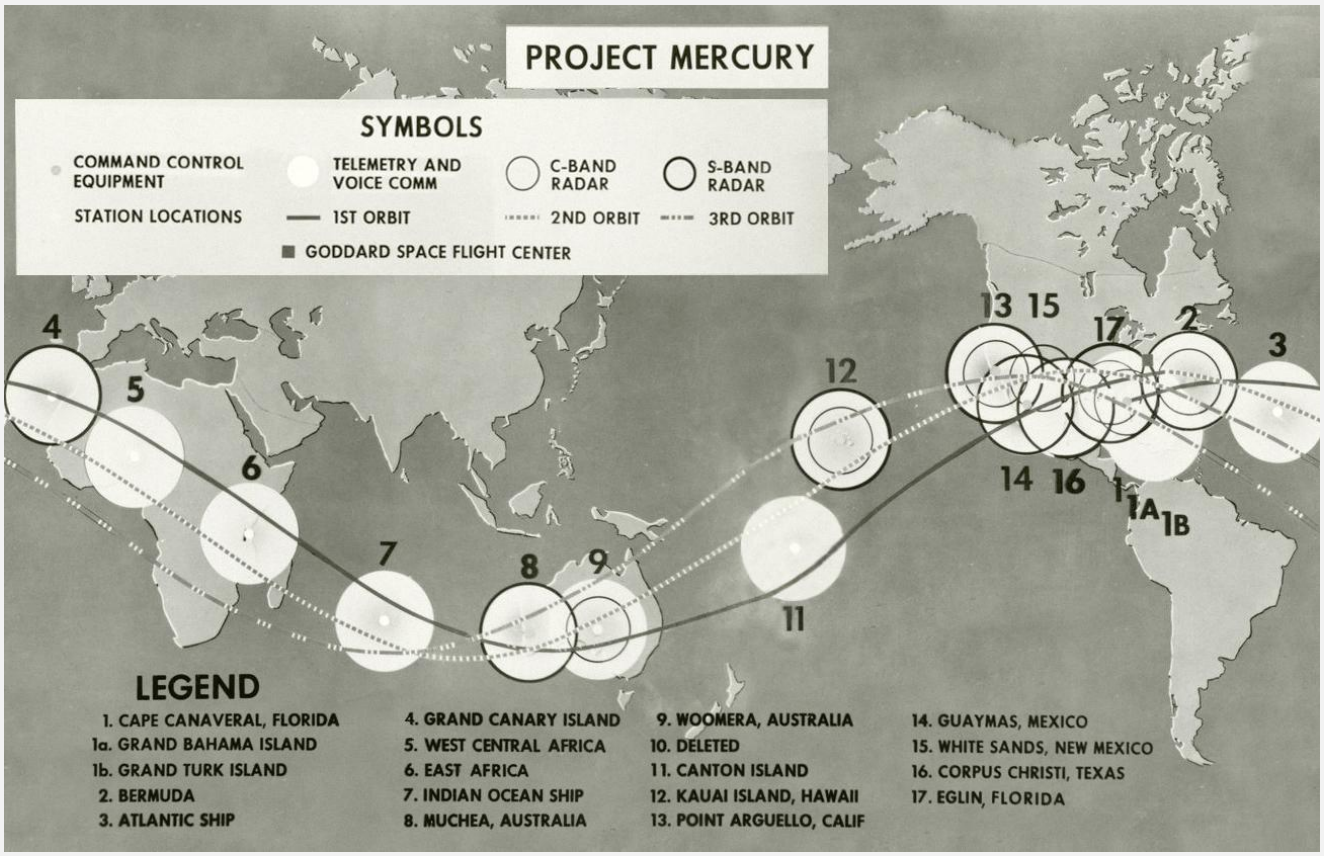
How many Australians remember the name Muchea (pronounced "Mewshay")? Where and what was it?

To find out we have to travel back in time to the days when most people thought it was too life threatening to get a man into space – back in the 1950s.

A few visionaries had different ideas and were busy working on ways and means, backed by their governments. Russia and America were locked in a battle to be first to put a man into space, and then to what many regarded as impossible, to land a man on the Moon. Money applied to this venture, it seemed, had no limits to achieve this prestigious goal, and at one stage the American Congress handed NASA an open cheque to beat the Russians. On the other side of the 'Iron Curtain' Premier Kruschev had great plans for the Russian space program, and he had a brilliant rocket scientist in Sergei Korolov. At the time this was kept very secret from the west.

The first step was to get a man into space, and the American space agency NASA planned a basic system to use readily available materials to fly one man and called it Project Mercury. If successful, it would be followed by Program Gemini, using two pilots to navigate, rendezvous spacecraft and walk in space in earth orbit, before Project Apollo with three astronauts would actually leave the Earth to put a man on the lunar surface.

To keep in contact with the spacecraft as it raced around the planet, a tracking system of 16 stations was implemented around the world, supplemented by ships in the oceans.



Mercury Tracking Station Network © 1962. Map adapted by Glen Nagle

This was well before there were communications satellites spread around the globe.

Australia was on the opposite side of the planet to America, so became an important link in the NASA networks, and still is with the tracking communications complex at Tidbinbilla near Canberra. An agreement between the American and Australian governments was drawn up to provide tracking facilities to support the American space program.

The site at Muchea was chosen for the manned space flight program because of its location under the flight path. Muchea was an important command station, meaning it could transmit instructions up to the spacecraft, particularly if there was an emergency and the spacecraft would have to land in the Pacific.

Muchea itself only consisted of a typical country general store run by Mrs Blanche Peters, an avid follower of space activities, now she had a real live tracking station nearby. To look out of her window at the paddock outside, you would mainly see stacks of 200 litre fuel drums. A three line telephone switchboard was associated with the store and Mrs Peters commented to reporters,

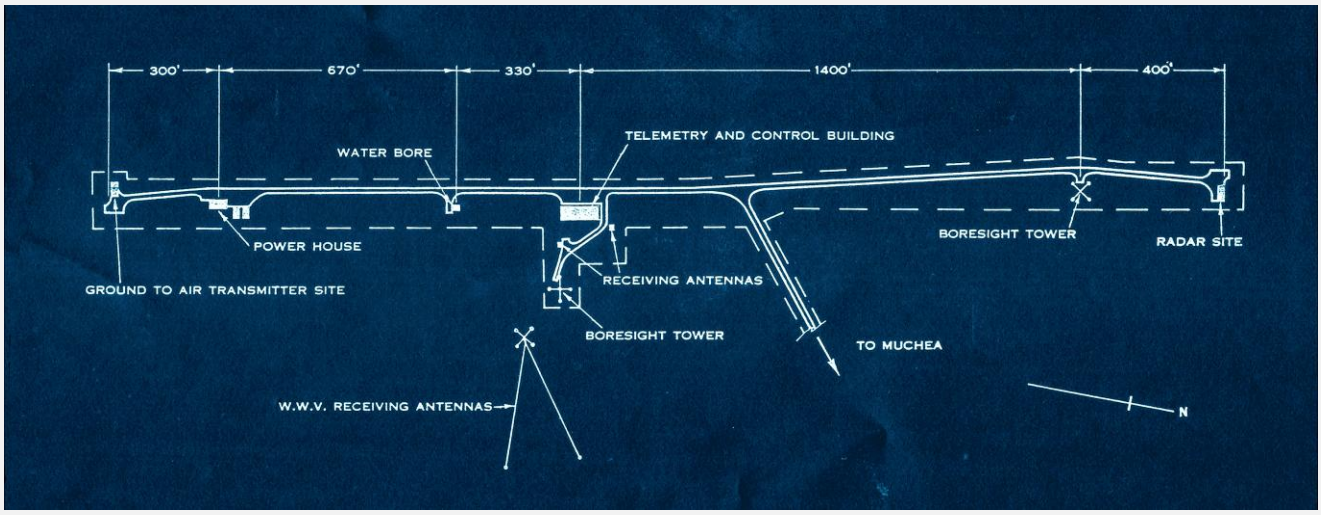
"My switchboard is essentially only a local service. If anybody gets sick in the district and they want a doctor, I'll have no choice but to cut them (the tracking station) off – Australians or Americans alike. I must tend to my own folk."

Manned by Australian government employees, many recruited from the defence forces, Muchea was built during 1960 on a sandy plain around 60 kilometres north of Perth, and consisted of a central building with some outbuildings, including an ex-wartime radar.

It was officially opened on the 24th of March 1961, just 19 days before the western world was rocked on its heels to hear that the Russians had launched a man into space. Cosmonaut Yuri Gagarin began a new era in human history by completing an orbit of the Earth in one hour and forty eight minutes.

Congress, NASA, in fact the whole country freaked out at what the Russians might do from space. House of Reps member Thomas Pelly reporting this episode on the floor announced,

"I suggest we went to sleep in 1945 and slumbered until the Eisenhower Administration got us under way in 1953, and today we have reaped the harvest of yesterday's neglects."



Facility Layout - Mercury Tracking Station No. 8 Muchea, Western Australia.

Pressure was applied to the American space program, but at least the Muchea Tracking Station and its team of Australian technicians and engineers were ready for action.

NASA had two manned flights before John Glenn's orbit, neither leaving America's shores, so Muchea wasn't involved. Alan Shepard and Gus Grissom completed two sub-orbital flights, Grissom nearly drowning when his spacecraft sank into the Atlantic under him.

In those days there was no Johnson Space Center. Mission Control with its Flight Controllers was located at Cape Canaveral in Florida and was laughably simple to 21st century eyes – the Flight Director had the only television monitor, the rest of the controllers only had lights, switches and indicators.

Project Mercury tracking Station No 8, located at Muchea in Western Australia, was one of two Australian stations in the Mercury network. The second station called Red Lake, No 9, was located at Woomera in South Australia. These stations were managed and operated for NASA by the Australian Government's Weapons Research Establishment of the Department of Supply.

The Muchea station was a typical installation with individual systems for each function required to keep in contact with the spacecraft, not like Apollo when all the functions were combined into one signal.

There were radar and acquisition aid tracking systems, which included telemetry reception and air-to-ground voice communication facilities, and because of its geographical position, being situated almost 180 degrees in Longitude from the launch, it was selected to have a command facility to transmit instructions to the spacecraft, as well as normal tracking, telemetry and voice capabilities.

There were no computers or even electronic calculators, and most of the equipment was tried and tested units from the military forces.

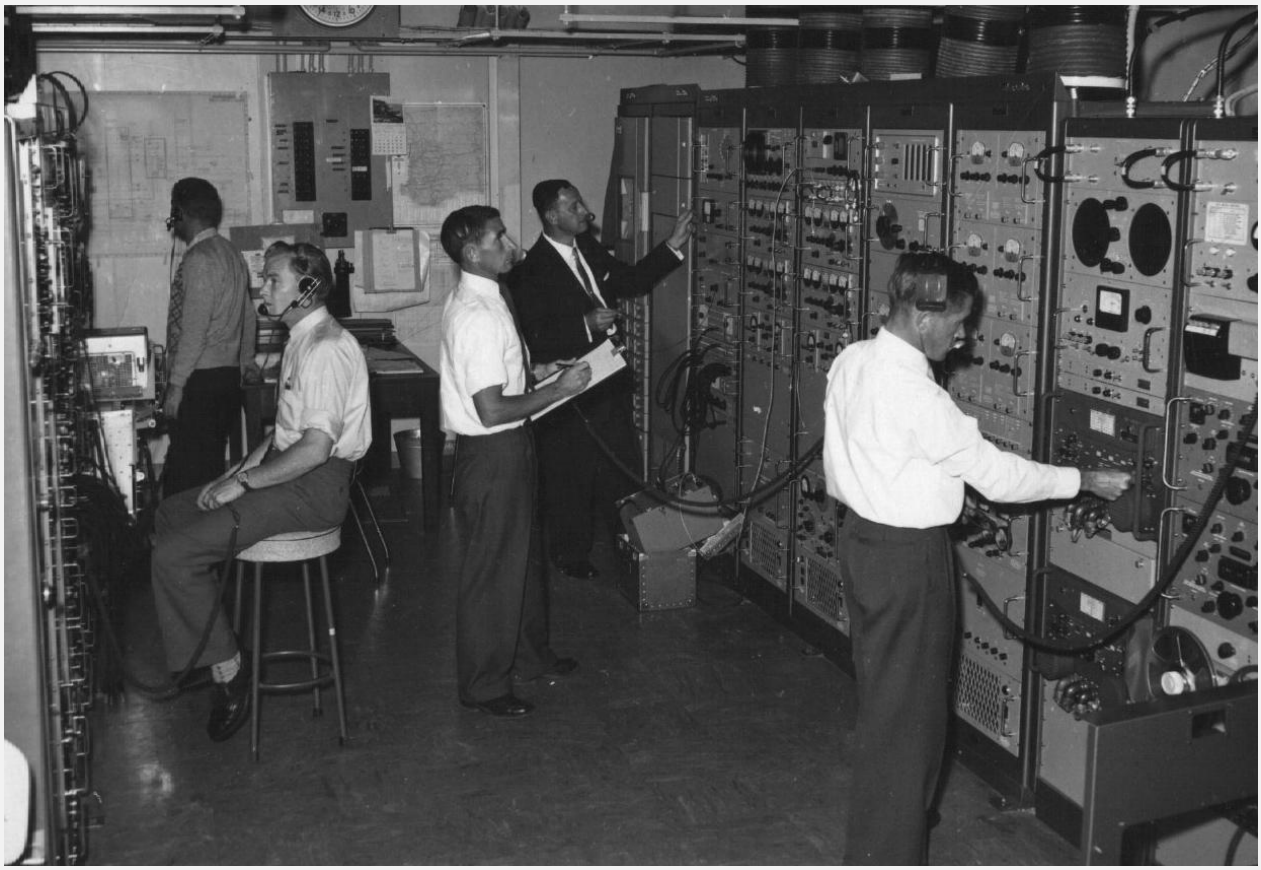
Before committing the station to tracking spacecraft, a RAAF C47 Dakota aircraft was fitted with a Mercury capsule communications system and flew calibration tests around the station. Unfortunately, when returning home on the evening of 31 July 1961 the Dakota left the RAAF base at Pearce and plunged into the hills of the Darling Ranges in a rain storm and caught fire, killing four of the flight crew. Three personnel in the back of the plane survived.

Muchea and Red Lake had short but illustrious careers. The first live cargo mission was tracking a chimpanzee called Enos.

Muchea also had its first drama when during a simulation for the mission on the road to Perth a car crashed into a pole holding up the copper wires carrying the signals from the station to the USA. Kevyn Westbrook, the communications supervisor, advised the PMG (now Telstra) officials it was urgent to get the pole back up, so a team of linesmen camped out beside the highway with poles, called pikes, propping the broken pole up in the freezing night until the simulation was finished.

Above: Muchea Control Room before the launch of Friendship 7.
Back left: Command Console, Back right: Comm Tech Console. Front left: Acquisition Area consoles.
Jack Duperouzel (far left); Gordon Cooper (dark shirt), Gerry O'Connor (3rd from right), Gus Pugh (far right).

Below: The Telemetry Area. Decoms on the left and Receivers on the right.
Left to right: Rex Hogan, Gordon MacDonald, Len Moyle, Sol Mathews, Colin Macnish.



The north-most of the Acquisition Aid antennas adjacent to the Telemetry and Control Building.

Above: The VERLORT (Very Long Range Tracking) trailer and radar dish. Image: WA State Records Office

Below: The Security Van at Muchea with Australian Commonwealth Policeman, Bill Ptolomey (circa 1961). Image: Glenis Austin (nee Wilkerson). Scan: Jenni Whyatt

Chimpanzee *Enos* pictured wearing a space suit and lying in his flight couch as a handler holds his hands. He is being prepared for insertion into the Mercury-Atlas 5 capsule. Image: NASA

On 29 November 1961 the Super Chimp Enos was launched into space to become America's first orbiting astronaut.

Muchea kept an eye on the spacecraft as it passed over Western Australia. Capcom (Capsule Communicator) astronaut Wally Schirra noticed someone had quietly put a banana at each console. Westbrook had a sense of humour,

"If these guys are communicating with a chimp. I thought they'd better start thinking like one," he explained.

Up in the spacecraft Enos was suffering anguish. He was trained to push buttons and pull levers at intervals, and when he was wrong he was zapped with an electric shock in his feet; when he pushed the right button he was rewarded with banana pellets. Wing Commander Warren Bishop was the Australian RAAF medical officer, called 'surgeons', explained,

"Over Muchea, on both passes, his task was to operate a preselected lever under the relevant unmatched geometric figure of three displays that lit up on his instrument panel. The telemetry readouts for the events and his reaction came out on his electrocardiograph trace."

Unfortunately, on the second orbit the rewarding system broke down, and whatever he did he was zapped in the feet. Baring his teeth with exasperation, visible in the on board movie, he pressed on trying to do the right procedures to the end. He was unstoppable and cleared the way for John Glenn's flight.

Meanwhile back in Western Australia, the Mayor of Bunbury proposed that lights in the area be left on during the night to help Glenn see the Earth during darkness. NASA had considered requesting the lights of Perth airport runways be left on, and the Minister for Civil Aviation, Senator Paltridge, agreed. State Premier Brand approved that the

Perth, the 'City of Lights' as seen from the International Space Station in July 2020. Image: NASA

Perth metropolitan street lights be left on all night and encouraged householders to turn on outside lights.

The Lord Mayor of Perth, Sir Harry Howard, disagreed with these proposals, declaring the idea was morally wrong, a waste of public money, and of no scientific benefit.

With the weight of public opinion against him he agreed to the proposal and NASA officials at Cape Canaveral cabled the City of Perth to thank them for their decision and Perth became famous around the world as the City of Lights.

John Glenn's flight was plagued by 82 days of maddening delays to get Friendship 7, his spacecraft, off the ground. The name Friendship was chosen in a contest within his own family.

Finally, at 10:47pm Perth time on 20th February 1962 Glenn was shoved into orbit by a Mercury-Atlas rocket from Launch Complex 14 at Cape Canaveral in Florida. Waiting on the other side of the world, Muchea's air conditioning was struggling to cope with 40°C temperatures, as the staff bent over their consoles preparing to lock onto the spacecraft's signal.

Glenn sped over the Indian Ocean, saw his first sunset, and plunged into darkness as he approached the West Australian coast where a full Moon brightened up the scene. Turning from studying the stars, Glenn looked out for the lights of Perth, now known as The City of Lights.

> Glenn said later, *"Through the window I could see several great patches of brightness down below. Gordon Cooper* (Mercury astronaut)*, who was on duty as Capcom at Muchea, had alerted me to look off to the right."*

Gordon Cooper speaks with John Glenn on his first pass over Muchea. From a camera mounted next to the Command console.

The first appearance of Friendship 7 at Muchea was 49 minutes 50 seconds after lift-off at a slant range of 1,889 kilometres at 11:37pm local time. Jack Duperouzel, manning the Acquisition Aid system, remembers,

> *"We had to locate the capsule first when it came over the horizon from the Indian Ocean. All the other antennas, the telemetry, transmitter and radar, were slaved to our antenna. We had the spacecraft in view for eight and a half minutes on the first two passes, and seven and a half minutes on the last pass."*

The first Australian to talk to a space traveller was Gerry O'Connor, the station Communications Technician (Comtech) manning the Air/Ground Console. In those early days it was the job of the

At the Command Console, Gordon Cooper speaks with John Glenn on his first pass over Muchea.

Comtech to initiate contact with the spacecraft, and hand over to the astronaut Capsule Communicator (Capcom).

O'Connor: *"Friendship 7 Muchea Com Tech. We read you. Would you …"*

Glenn: *"Hullo Muchea Com Tech. This is Friendship 7 reading you loud and clear. How me?"* and the dialog was turned over to the two astronauts.

The next station was Red Lake at Woomera in South Australia, and the spacecraft appeared over the horizon at Woomera just under 4 minutes before Muchea lost the signal, so the conversation flowed from Muchea to the Capcom at Red Lake without a break.

Glenn raced around the Earth in 88.5 minutes, reaching a speed of 28,233 kilometres per hour and a maximum height of 265 kilometres. Then, during the second orbit Mercury Mission Control at Cape Canaveral noticed that the telemetry indicated the spacecraft's heat shield was loose.

Was the heat shield really loose, or was it a faulty detecting circuit? There was no way to find out. If the shield was loose, there was every chance that Glenn and his spacecraft would burn up into dust on re-entry.

Glenn reached Muchea for the third time at 2:44 am local time. Although the Flight Controllers were confident the heat shield was okay, it was an agonising period after the retro rockets were fired over the Californian coast and the spacecraft began its descent.

So, after three orbits and travelling a distance of 134,441 kilometres in 4 hours 55 minutes and 23 seconds Glenn dropped safely into the Atlantic Ocean to be picked up by the destroyer USS Noa, code named Steelhead for the mission.

A message was sent from Cape Canaveral to Muchea to say that the station led all the other stations in the network on all three passes on radar coverage and accurate sightings. It got more coverage than any other site and got the maximum data.

John Glenn, Annie Glenn, and Vice President Lyndon Johnson at the New York 'tickertape' parade.
Image: NASA via Associated Press.

Despite his critics and his initial views, City of Lights Mayor Sir Harry Howard was in the third car after Glenn and Vice President Lyndon Johnson in the ticker tape parade through New York.

Three missions followed – in May 1962 Scott Carpenter had a similar mission in Aurora 7; in October Wally Schirra circled the Earth 6 times in Sigma 7; and in May 1963 Gordon Cooper tried 22 orbits lasting over 34 hours in Faith 7. Cooper said after the mission,

> *"I encountered no difficulty in being able to sleep – in fact you have difficulty not sleeping. I found I was cat-napping and dozing off frequently."*

The station at Muchea was not organised to support 24 hour missions, so when Faith 7 dropped out of sight for a few hours as its orbit regressed, key staff members were provided with a caravan to sleep in during the periods when the spacecraft was out of sight of the station. Westbrook remembers,

> *"We were woken up by, would you believe, newspaper reporters, and I got my photo on the front page of the newspaper in my pyjamas – everybody told me they knew I slept on the job! I was very tired at the end of the mission, I was so tired they wouldn't let me drive the car, and they got a special driver to take me home. I got into the back seat of the car, and I was asleep before we had gone more than ten metres."*

So, on the 12th of June 1963 the Mercury Project finished as a very successful program, achieving all the goals set, and Muchea closed in February 1964, to make way for the Carnarvon Tracking Station, and the Gemini program.

The original NASA Australian stations at Muchea and Red Lake successfully played their part in NASA's plans to land a man on the Moon with Project Apollo.

Essay by Hamish Lindsay, 2012-2014.
Images, illustrations and captions by
Hamish Lindsay, Colin Mackellar, and Glen Nagle.
Unless specified, audio and video recorded,
edited and encoded by Colin Mackellar.
PDF formatted by Glen Nagle.

#GG
MUC005A
RR AADE ACRO GMSC GSTS GUNV
DE AMUC 005
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FM MUCHEA
TO AADE/WRE KIRKPATRICK ANDERSON/SUPDEP MELB HOMEWOOD HARTMAN/
CANBERRA DSIF S M PUGH N V HURRELL
ACRO/L WAINWRIGHT K WESTBROOK C RAMSBOTTOM W KEMPEES C MACNISH
C MCATEE D BLACKMAN
GMSC/LT CMDR M S CARPENTER LT CMDR W M SCHIRRA MAJ G COOPER
MAJ D SLAYTON
GSTS/WESTERN ELECTRIC CO INC LAURELDALE PA/E DURET C LEWIS
GUNV/J DOWLING O COVINGTON
DLD/F ASH M BROWN S BARRETT I BARRAS D CHENEY R CHAMBERLAIN
J DUPEROUZEL C DAWSON D GIBSON J HATFIELD L HANLEY R JARVIS
A JOLLEY K LEE F LANDWEHR G MCDONALD L MOYLE J MOIR A MAFFESCIONI
T MCQUAID T MASON R MEADOWCROFT B MORGAN S MATHEWS R NORTON
G NEWMAN G OCONNOR C OLSSON R SPARKS J SMITH W SCOTT P SAW
R STEWART W SHEEHAN G TAYLOR J TANNER J TRAEGER A VAN OVERBEEK
J WALKER L WATSON G WILKERSON

M U C H E A

A STATION IN THE MERCURY NETWORK

FROM NOVEMBER 1960 TO FEBRUARY 1964

TRACKED MA-4 THRU MA-9

"HER STAFF DISPERSED
EQUIPMENT GONE
HER SPIRIT LIVES
TO TRACK AGAIN"

28/0300Z FEB AMUC

This TWX was sent to everyone on the Mercury Network at the close of the Muchea Tracking Station. Preserved by Jack Duperouzel. Scan: Colin Mackellar

What remains at Muchea of the Acq. Aid antennas and the T&C building foundation. Photo: Andrew Todd 2011

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.