

# *The Search for the original Apollo 11 Moonwalk TV tapes*

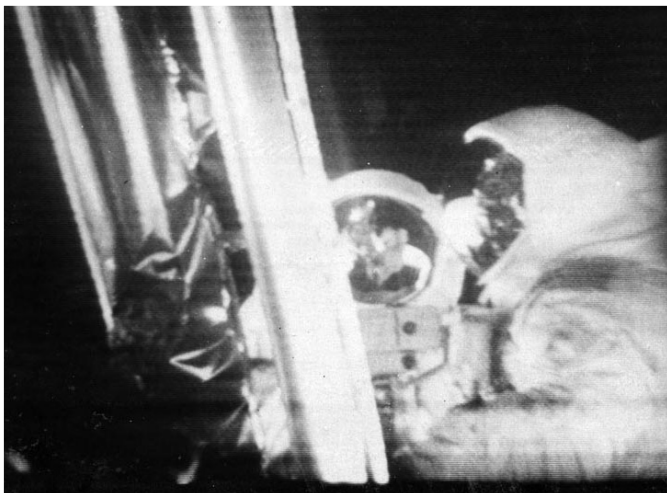
**The Apollo 11 Moonwalk in July 1969 was the climax of the Apollo Program with the largest television audience in history watching Mankind's first steps on the Moon.**

Surprisingly, the best quality TV was never seen outside the tracking stations. The pictures seen by the world were substantially degraded by the time they reached Houston.

The highest quality TV was recorded on telemetry tapes at the three tracking stations which received the signal – Goldstone in California and Honeysuckle Creek and Parkes in Australia.

These 37-year-old tapes have never been replayed. If they can be found and digitally processed, they could produce stunningly clear TV – much better than was seen in Houston or on the worldwide broadcast. **However, time is running out to find these irreplaceable tapes before their data is lost forever.**

>> Evidence suggests the original tapes may be in storage somewhere at a NASA facility. <<



*Neil Armstrong reads the plaque on the ladder of the LM – a Polaroid photo of the TV picture received by the Parkes Radio Telescope. Note the uniformly bright, detailed picture, including the reflection of Neil*



*and the LM in Buzz Aldrin's visor (center).*

**Right:** A frame of the official NASA recording, after the TV had been processed and relayed to Houston. This is what the world saw.

## **The Lunar TV Camera**

Early in the Apollo Program, it was realized that bandwidth from the Moon would be very limited. Voice, telemetry, biomedical data and television would have to share the link from the Lunar Module.

Consequently, NASA budgeted only 500kHz for TV from the Lunar surface – much less than the 4.5MHz standard for commercial broadcast television.

NASA mission planners called for a Lunar Camera which could cope with this limitation by using a *non-standard slow scan* format of 320 lines of resolution at 10 frames per second (instead of the US TV standard of 525 lines at 30 frames per second).

A team at Westinghouse spent five years developing such a TV camera. It was capable of producing a very good black and white picture in the harsh lunar environment with its extreme temperatures and lighting conditions.

>> This non-standard TV signal from the Moon had to be converted to standard TV format before it could be released to the waiting world. <<



*At Tranquillity Base, Neil Armstrong mounted the TV camera on a tripod to provide the view seen in the images on page 2.*

## The Telemetry tapes contained the best TV

On the Moon, the signal from the TV camera was combined with voice, telemetry and biomedical data and transmitted to Earth from the S-Band antenna atop the Lunar Module.

The downlinked data – including the slow scan TV – was recorded onto telemetry tapes at each of the U.S. and Australian tracking stations.

>> It is these tapes that are being sought. <<

## Scan Conversion – the beginning of image loss

The conversion from slow scan to standard US TV format was achieved by using specially built *scan converters*. There was one each at the Goldstone and Honeysuckle Creek Tracking Stations, and one in Sydney for the picture from the Parkes Radio Telescope.

In the conversion process, picture resolution, contrast and brightness suffered, and extra system noise was introduced.

>> It was the output from the scan converters which was sent to Houston and seen around the world. <<

## Further loss of picture quality

Most of the TV broadcast came via the Australian stations. *In addition to scan conversion*, their TV was further degraded by long distance analog transmission to Houston –

Television from the Moon began with the TV camera's signal, which was fed via cable to the Lunar Module's transmitter. The composite signal from the LM, including telemetry and slow scan TV, was received at both Honeysuckle Creek and Parkes and sent by microwave links to Sydney.

From Sydney, the TV was relayed by microwave links, the Intelsat III satellite and AT&T lines to Mission Control in Houston. The total transmission distance from the tracking stations to Houston was almost 50,000 miles / 80,000km.

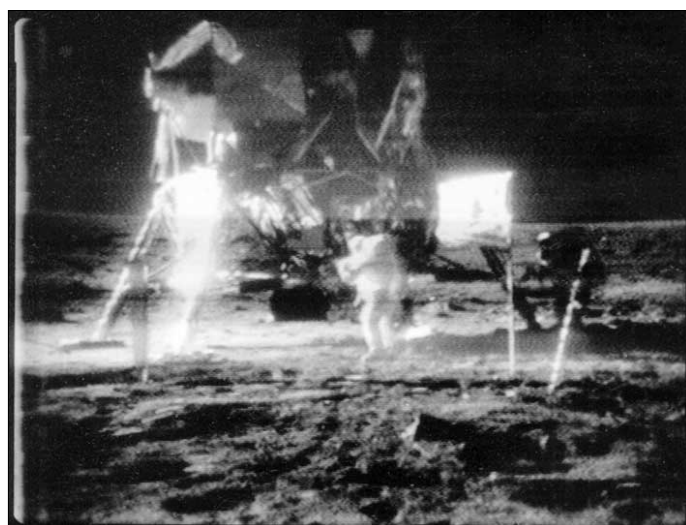
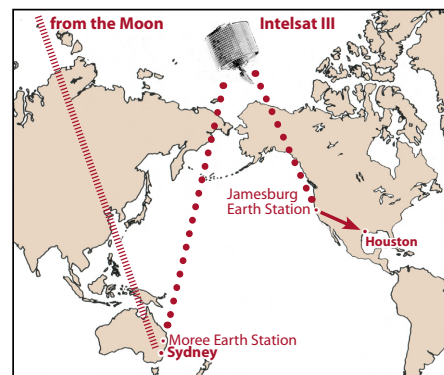
By the time the pictures were seen by the international TV audience, they were substantially degraded.

Lastly, the official NASA recording of the Moonwalk is on 16mm film, which was considered to be more robust than videotape. This kine-recording method possibly resulted in further loss in picture quality.

>> Finding the original tapes would allow the high quality TV to be seen outside the tracking stations for the first time. <<



*These are some of the tapes used at the tracking stations to record the Apollo 11 slow scan TV as it was received direct from the Lunar Module. They are what we want to find.*



*A Polaroid photo of the slow scan TV monitor at the Goldstone tracking station in California. Only the personnel at the tracking stations saw the high quality TV as it was received.*



*The same TV frame as was broadcast to viewers around the world. The NASA telerecording has cropped the top of the picture.*

## The search for the Apollo 11 Moonwalk Slow Scan Tapes

In 2004, an Apollo-era Honeysuckle Creek telemetry tape was found in Australia. It was believed to contain Apollo 11 EVA slow-scan TV. The tape was sent to the Goddard Space Flight Center in Maryland – the only facility still capable of playing it. Sadly, it was shown to be an older Honeysuckle simulation tape from 1967.

>> **Most importantly, however, the testing at Goddard verified that the data was recoverable from this 37 year old NASA Apollo tape – even when stored in an uncontrolled environment.** <<

During the Moonwalk the Goldstone, Honeysuckle Creek and Parkes stations recorded the Apollo Lunar TV Camera's raw slow scan signal on analog tape machines. These original tapes were sent to the the Goddard Space Flight Center.

Since mid 2005, a search for these Apollo 11 telemetry tapes has been underway.

So far, the search has found that GSFC transferred tens of thousands of 'magnetic data tapes' to the US National Records Center, in Suitland, Maryland, during and after the Apollo Moon missions.

At the NRC, **Accession 255-69A-4099** was opened in December 1969. **This particular Accession appears to be the Goddard depository of all the Apollo telemetry tapes – including the Apollo 11 tapes.** This Accession was one of the most active Accessions during the Apollo period. A total of 2614 boxes of tapes passed through the National Records Center from Goddard – at one point there were over 700 boxes in this Accession stored at the National Archives.

During the period 1975–1979 *all except two boxes* in the Accession's were recalled by Goddard for "Permanent Retention". The labels on the tape reels in those two remaining boxes indicated they were Apollo 9 telemetry tapes recorded at the Canary Islands tracking station. These labels have the same format as was used for the Apollo 11 tapes that are the subject of this search. (See illustration at right.)

A new search is being planned, aimed at finding what happened to the Goddard-recalled Apollo 11 mission data tapes. They could be still be at Goddard or at a subsequent location within the NASA archiving system. The search involves sifting through 30-year old records and contacting retired Goddard personnel.

>> **No-one knows how much longer the original slow-scan tapes will last but, if they can be found, they could produce unsurpassed views of mankind's first steps onto another world.** <<

Above: The Accession 255-69A-4099 document from the National Records Center.

Below: An Apollo 9 Canary Island Tracking Station tape label found at the National Archives – one of the few magnetic tapes not recalled by Goddard.

(Use your PDF viewer to zoom in on the images.)

## An Appeal for Help

We are keen to speak with anyone (particularly retirees) involved in the **management, disposition and storage of these Apollo 'Magnetic Tapes' tapes** at the Goddard Space Flight Center – or any other NASA or NASA-utilized facility where they may have been shipped.

We would also appreciate hearing from anyone who can direct us to such people.



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### For More Information

including photos, video, and a detailed report on the search, see

[www.honeysucklecreek.net/Apollo\\_11/tapes](http://www.honeysucklecreek.net/Apollo_11/tapes)

20 July 2006.