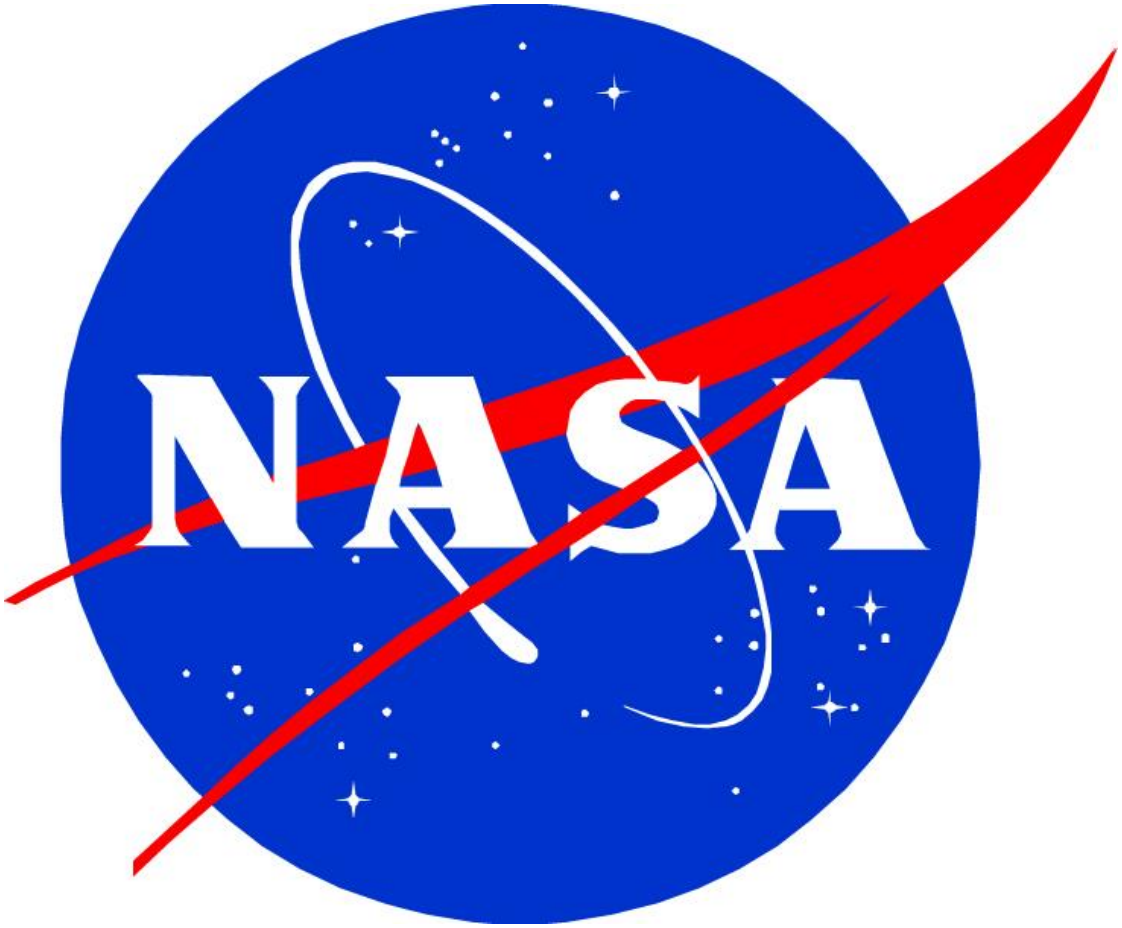
NASA´s Tracking Network

MSFN

(Manned Space Flight Network)



Carlos González

The USA manned Flight Program was the most aggressive, intuitive, work demanding, brain teasing/storming, and strong generator of ideas, designs, and technological development of the last part of the 50s and the decade of the 60s.

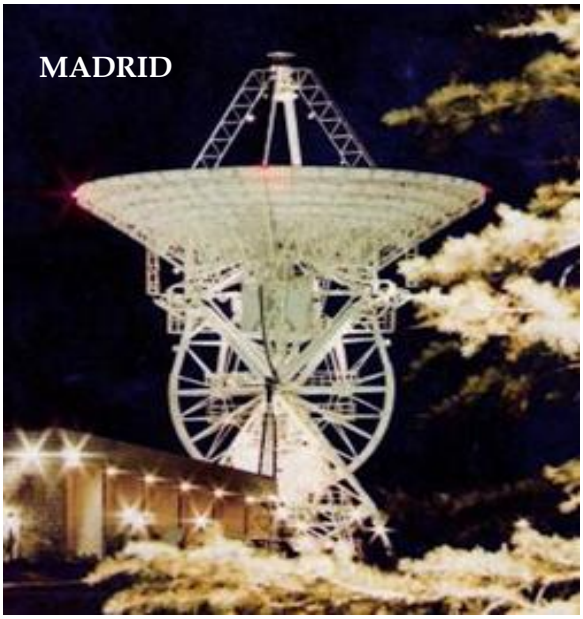
It reached its highest point with Project Apollo with an unprecedented success, many times simply by a matter of luck, but most of the times due to a great dose of human ingenuity and knowledge.

But this Program would not have been possible without the help of the ***MSFN***

ever built and ever used for a specific task.

The principal elements of the MSFN support were the Tracking Stations with 26 m antennas at ***Madrid***, Spain; ***Honeysuckle Creek***, Australia; and ***Goldstone,*** California, USA.

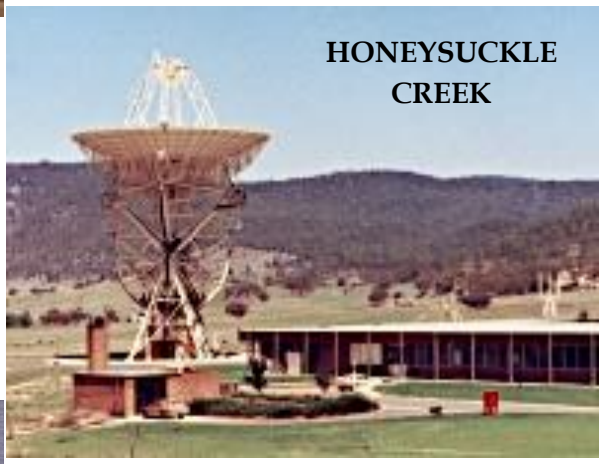
These Stations were supplemented with their equivalent counterparts of the ***DSN***



(*Manned Space Flight Network)*, and that of NASCOM *(NASA Ground Communications System).*

The MSFN used ground tracking stations throughout the world along with ships and tracking aircraft.

NASCOM comprised the most complex communications network



(Deep Space Network), also with diameters of 26 m, and residing in the same Countries. They acted as WING sites (backups) to the prime site.

To be able to cover the greatest percentage of sky that the ground stations couldn´t, the MSFN had three ***AIS*** (Apollo Instrumentation Ships)

assigned: USNS *Mercury*, USNS *Redstone*, and USNS *Vanguard*, modified to include several 9 m antennas, and a missile tracking ship, the MRI *Huntsville*.

They also had four ***ARIA*** (Apollo Range Instrumentation Aircraft), which originally were Boeing C-135 Stratolifter cargo aircraft and were latter modified by a contract among NASA, DoD, McDonnell Douglas and Bendix to include a steerable 2.1 m antenna dish in its distinctive *Droop Snoot* or *Snoopy Nose*. The EC-135N ARIA became operational in January 1968.

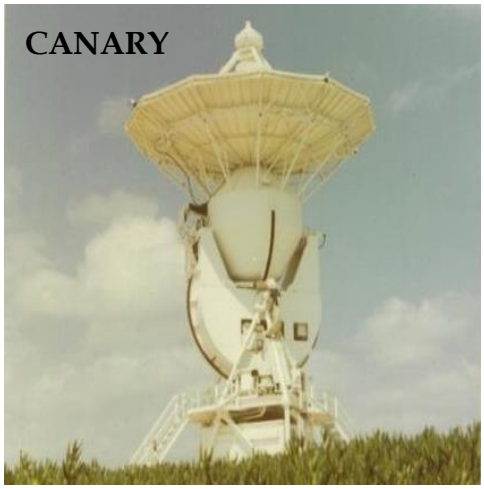
The rest of the network was composed of several 9 m ground antennas, around the globe, with S-Band capabilities plus others with: VHF/UHF, C-Band Radar, or both.

A few of the most known due to the amount of contacts with Apollo spacecraft were:

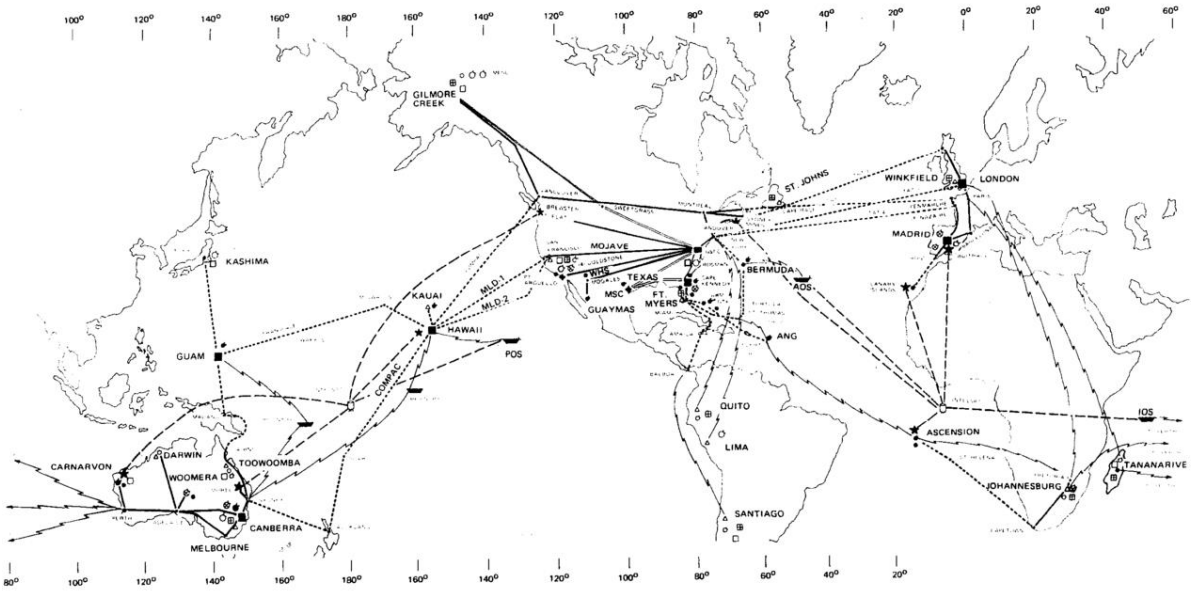
1. Related to launch and Earth orbit: ***MILA*** *(MERRITT ISLAND)*, ***BDA*** *(BERMUDA)*, ***TEX*** *(CORPUS CHRISTI)*, and ***CYI*** *(CANARY ISLANDS)*.

2. Related to Earth orbit and reentry: ***ANG*** *(ANTIGUA)*, ***ACN*** *(ASCENSIÓN ISLAND)*, ***TEX*** *(CORPUS CHRISTI)*, ***GBM*** *(GRAND BAHAMAS ISLAND)*, ***GWM*** *(GUAM)*, ***GYM*** *(GUAYMAS)*, and ***HAW*** *(HAWAI)*.

In addition, the 64 m antennas at ***JPL*** (Jet Propulsion Laboratory station at Goldstone) and ***CSIRO*** (Australian Commonwealth Scientific and Industrial Research Organization at Parkes), Australia, were used in support of the lunar activities whenever possible.

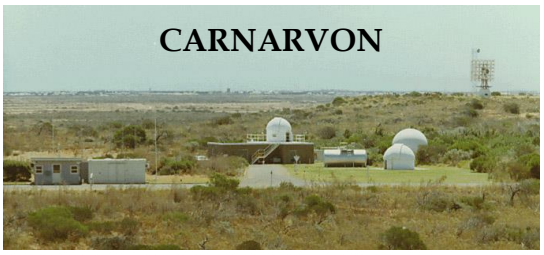


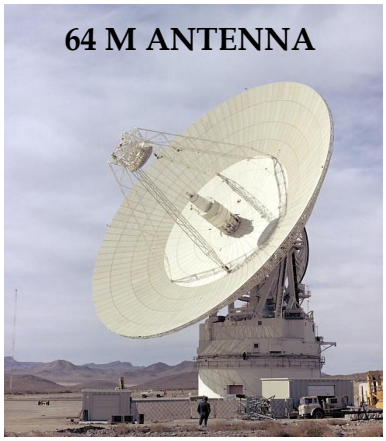
Voice and data to/from the MSFN and MCC were negotiated by NASCOM by the primary switching center at ***GSFC*** (Goddard Space Flight Center), Maryland, and subsequently by subsidiary centers at Canberra, London, Madrid, and Honolulu.



NASCOM SWITCHING

Not directly related to tracking, but to prevent astronaut accidents due to excessive radiation was the ***SPAN*** (Solar Particle Alert Network). The three NASA multiple-telescope observatories were spaced approximately 120° around the world and maintained a continuous monitor of Sun flare activity. These observatories were: ***Boulder***, USA; ***Canary Islands***, Spain; and ***Carnarvon***, Australia.





And finally, some of the 9 m. locations having S-Band systems, also had X-Band and C-Band radars and were used as Range Safety Stations. These were used to ensure that a launch vehicle malfunction would not cause any danger to the general population. The ***RSO*** (Range Safety Officer) had the responsibility of aborting or destroying a vehicle that flew outside of its normal path and could endanger people.

During Apollo, some of these stations were: ***The Bahamas*** and ***Antigua***, though NASA also received information on range safety from ***Argentina***, ***Newfoundland***; ***Wallops Island***, ***Virginia***, or ***KSC*** (Kennedy Space Center).

NOTE

All photographs depicted in this essay are from public Internet publications and they will not be used to collect any income.