



This chart has been purposely drawn out of scale to better illustrate the major events of the mission. A scale drawing of the Earth and the Moon below better illustrates the daunting distance that the Apollo missions had to travel to reach the Moon.

Lunar Orbit Rendezvous (LOR)

An Apollo Mission profile using the Lunar Orbit Rendezvous technique involved effectively transporting four separate spacecraft to the Moon; a Command and Service Module (the CSM), and Lunar Module (LM) consisting of a descent and an ascent stage. Stacked together at the top of the rocket, a single three stage Saturn V could place all of them into Earth orbit, (steps 1–6). Following a spacecraft ‘health’ check whilst still in a parking orbit, the final stage of the Saturn (the S-IVB) would then be reignited in an operation called Trans-Lunar-Injection, or TLI, (stage 7). Now on a course to intersect the Moon in three days’ time the CSM would detach (stage 8) and turn 180 degrees to face the LM, still sitting inside the S-IVB. By slowing down very slightly to allow the SIV-B to catch up, the nose of the

Command Module (CM) could be docked with the top hatch of the LM (stage 9). Then, by accelerating gently away from the S-IVB, the LM could be extracted (stage 10).

Together the CSM, docked to the LM, would continue towards the Moon making any mid-course corrections which Mission Control deemed necessary (stage 11). The mission was now flying on a path called a ‘free return trajectory’ which would, if nothing more was done, harness the Moon’s gravity to sling them back towards Earth. Attaining lunar orbit was only possible by making a burn called Lunar Orbit Insertion, or LOI, (stage 12) using the CSM’s main engine to fire in the direction of travel, slowing down the spacecraft enough to be captured by the Moon’s gravity.

The following day, the Commander (CDR) and the Lunar Module Pilot (LMP) would transfer to the LM, leaving the

Command Module Pilot (CMP) in the CSM (stage 13). The LM and CSM would then separate (stage 14) and using its descent engine the LM would brake to slow down, putting it on a trajectory which would intersect the Moon’s surface. Using the descent engine’s variable thrust the pilots could make a controlled – even pinpoint landing (stage 16). After suiting up to depressurise the LM the two astronauts would open the side hatch and climb down the ladder to explore the Moon’s surface (stage 17). After returning to the LM they would ignite the ascent engine to blast them back up into Lunar Orbit (18) leaving the descent stage on the surface. The LM’s ascent stage would then rendezvous and dock with the CM and the astronauts would transfer themselves and their equipment and rock samples back into the CSM (stage 20).

With the LM’s role over it would be jettisoned (stage 21) leaving the CSM to bring them home (stage 22) in a procedure called Trans Earth Injection, or TEI, (stage 23) to accelerate away from the Moon’s gravity and head back towards the Earth. As on the way out mid-course corrections could always be carried out to fine tune the spacecraft’s trajectory (stage 24) and the point at which it would hit the Earth’s atmosphere. An hour before re-entry the Service Module would be jettisoned from the Command Module (stage 25) just leaving the very apex of the original rocket stack to return to Earth. The heat generated by re-entry would cause a brief period of radio blackout (stage 26) before the main chutes were deployed to carry the spacecraft to splashdown (stage 27).



Earth

240,000 miles



Moon