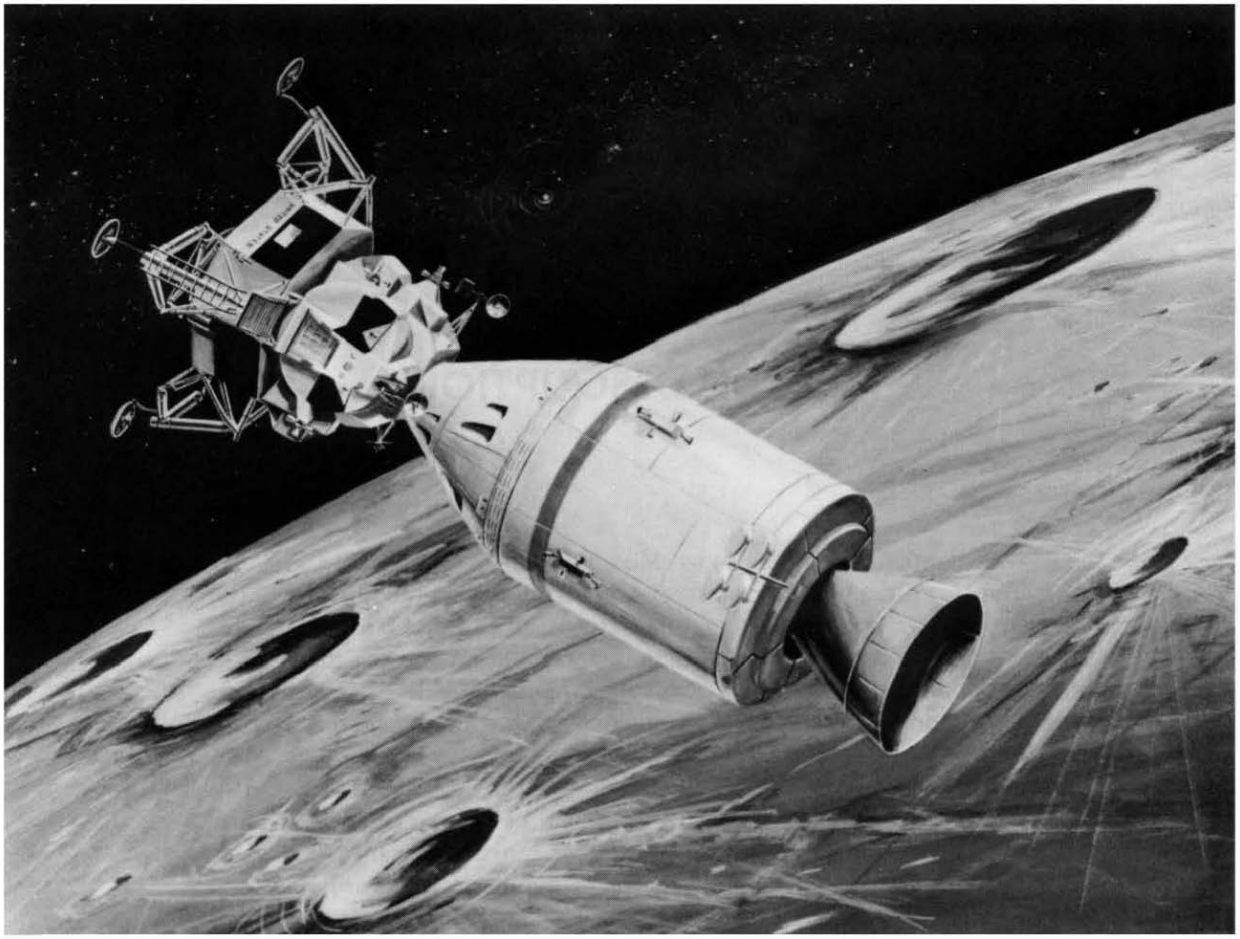
MISSION DESCRIPTION

A typical mission of the Lunar Module (LM) begins shortly after its separation from the coupled, orbiting Command/Service Module, continues through lunar descent, lunar stay, lunar ascent, and ends at rendezvous with the orbiting Command/Service Module before the return to earth. The LM mission is part of the overall Apollo Mission, the objective of which is to land two astronauts and scientific equipment on the moon, and return them safely to earth.

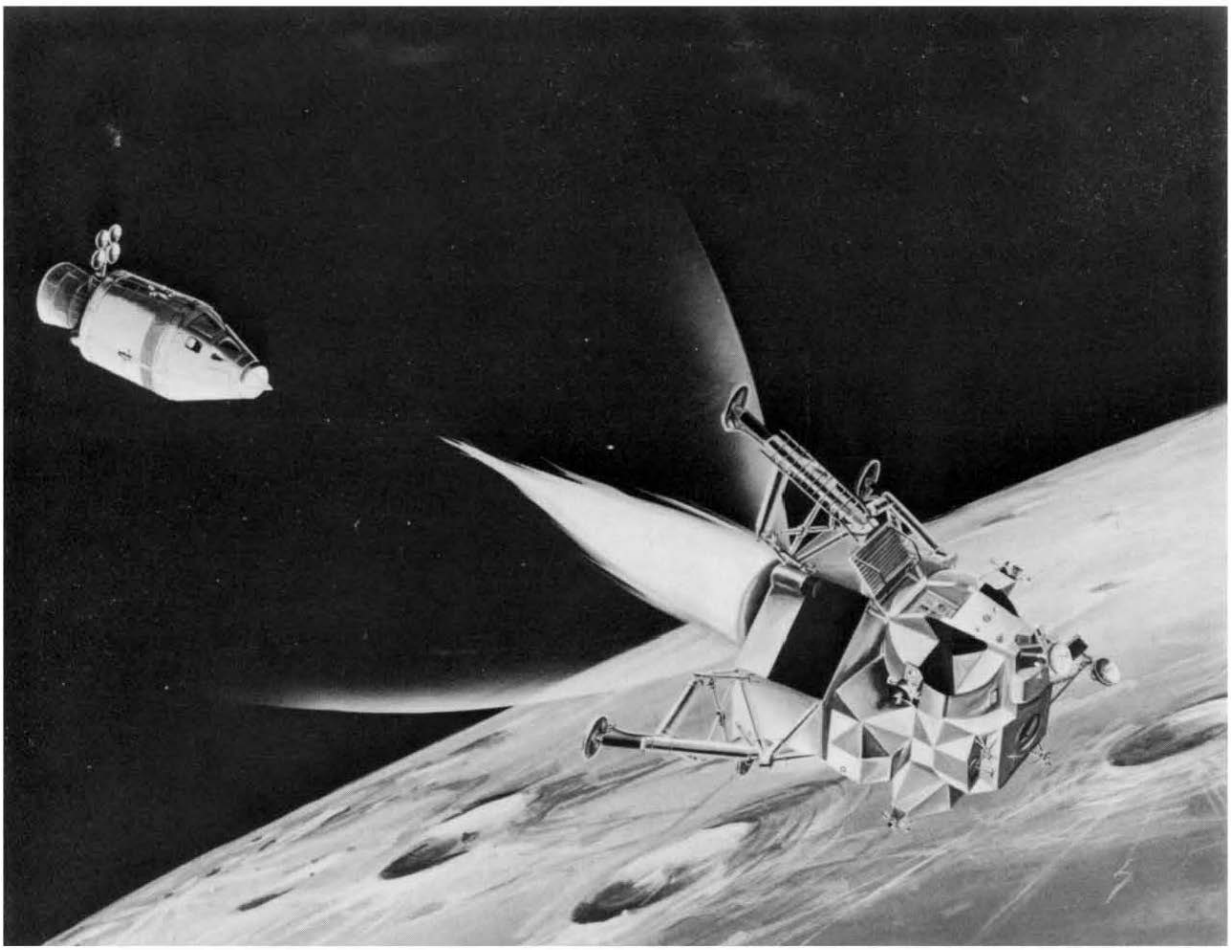
The three-stage, Saturn V launch vehicle will be used to boost the Apollo spacecraft into earth orbit and to provide the thrust necessary to propel it into its translunar path. Once on course to the moon, the third, and final propellant stage of the Saturn V is jettisoned, and the spacecraft (consisting of the Command, Service, and Lunar Modules) continues its journey toward a lunar orbit.



R-106

Upon approach to the moon, the re-ignitable propulsion system contained in the Service Module inserts the spacecraft into orbit above the lunar surface. Once orbit is achieved, two of the three astronauts in the Apollo team transfer from the Command Module, to the Lunar Module. A thorough checkout of the Lunar Module systems is then performed.

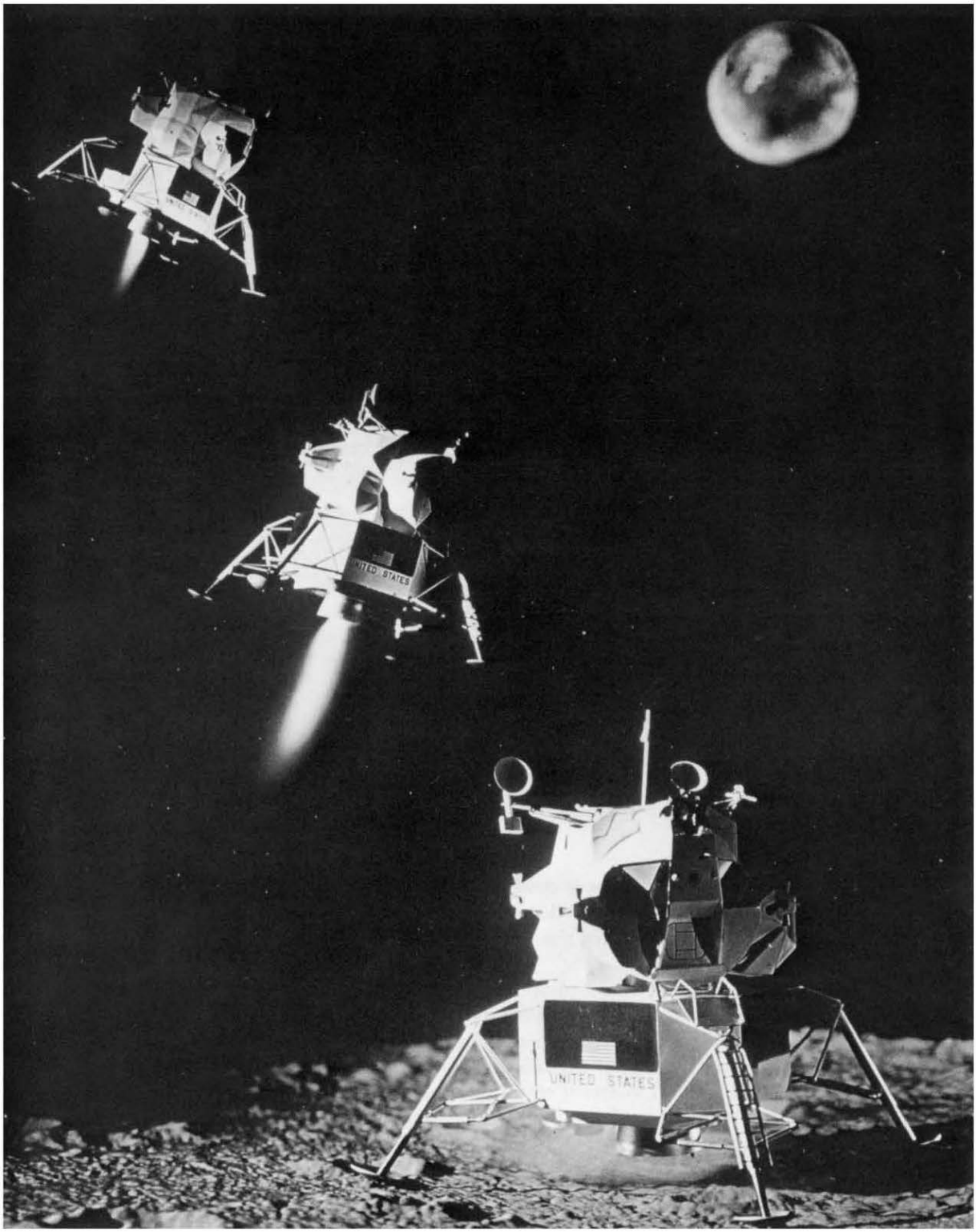
At a predetermined point in the Lunar orbit, the LM separates from the Command/Service Module which remains in lunar orbit awaiting the return of the LM at the end of the mission's rendezvous maneuver.



R-107

By igniting the throttleable descent engine (contained in the LM's descent stage), the LM's velocity is reduced and the spacecraft begins its trajectory toward the proposed landing site.

The LM's descent is automatically controlled to an altitude of a few hundred feet by its Guidance, Navigation, and Control Subsystem. During the final landing phase, the two man crew selects a favorable landing site and, by manual control of the reaction control system jets (clustered at the four corners of the LM ascent stage) and the variable thrust descent engine, maneuvers the craft to the correct attitude over the landing site and guides it to a gentle touchdown on the moon.



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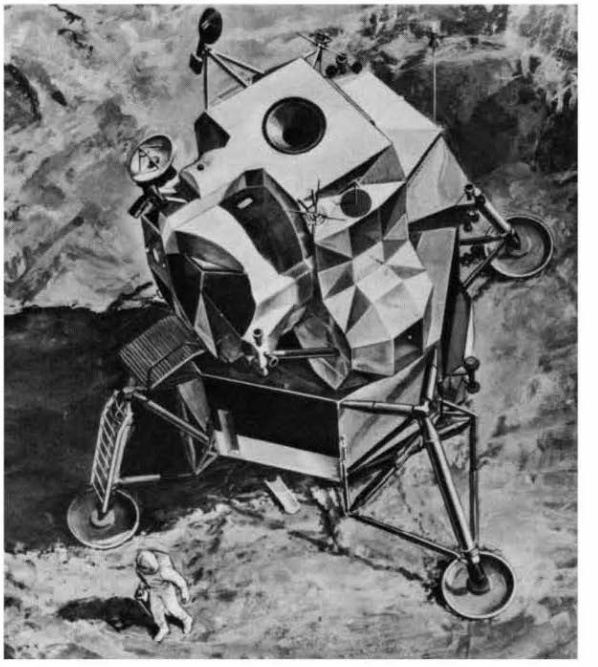
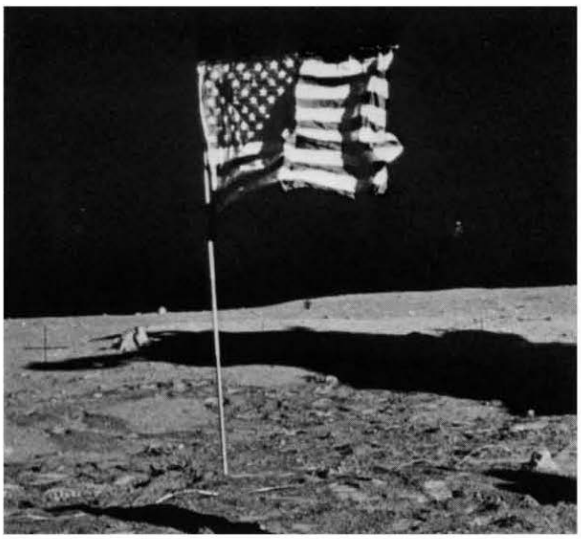


R-109A

Following touchdown on the moon, the LM crew checks all systems to determine whether damage was incurred during the landing, and to ensure that the systems will perform the functions required for a successful departure and rendezvous. All equipment not essential for the lunar stay is turned off.

With the LM secured for the lunar stay, both astronauts don their portable life support system, depressurize the LM and the Commander leaves the module to inspect the exterior for damage. As he descends the LM ladder, he actuates the mechanism which deploys the modularized equipment stowage assembly (MESA) containing a TV camera and other equipment used on the lunar surface. The Commander is followed shortly by the LM pilot.



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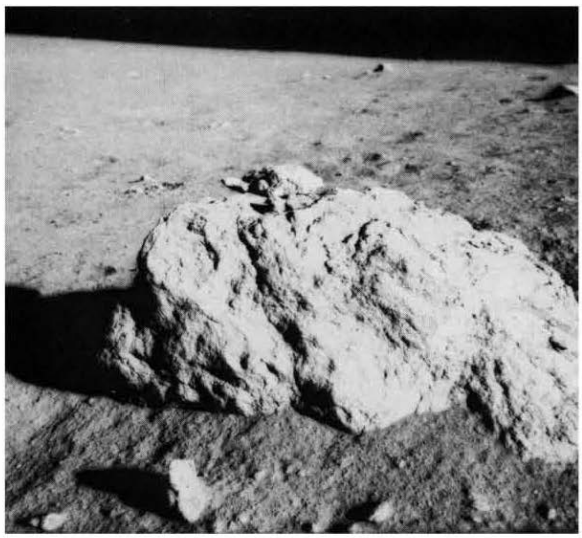

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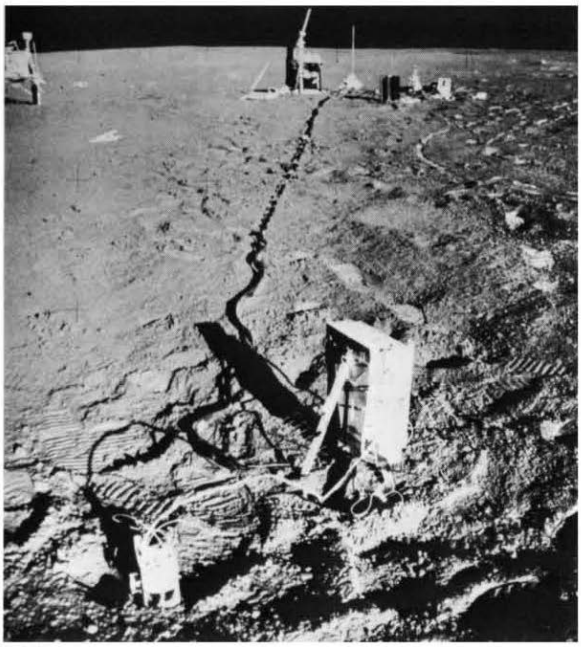

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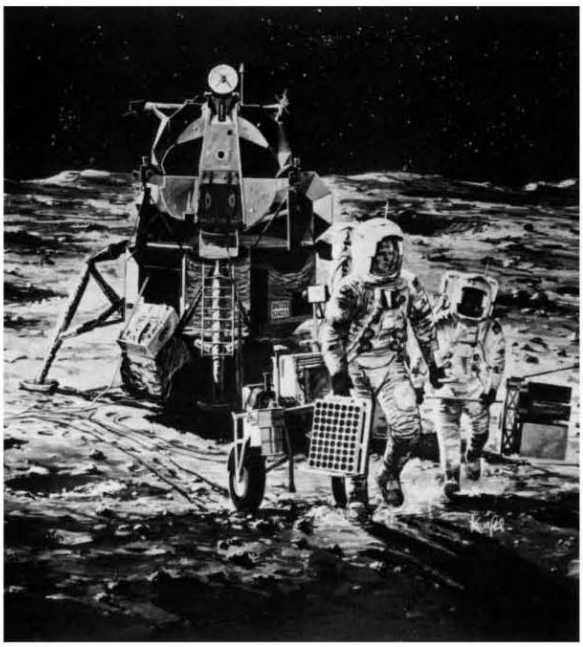
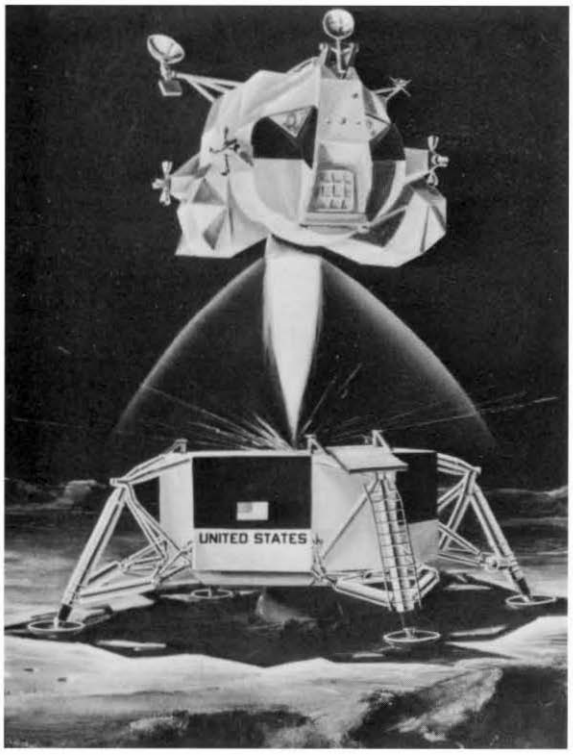


R-163

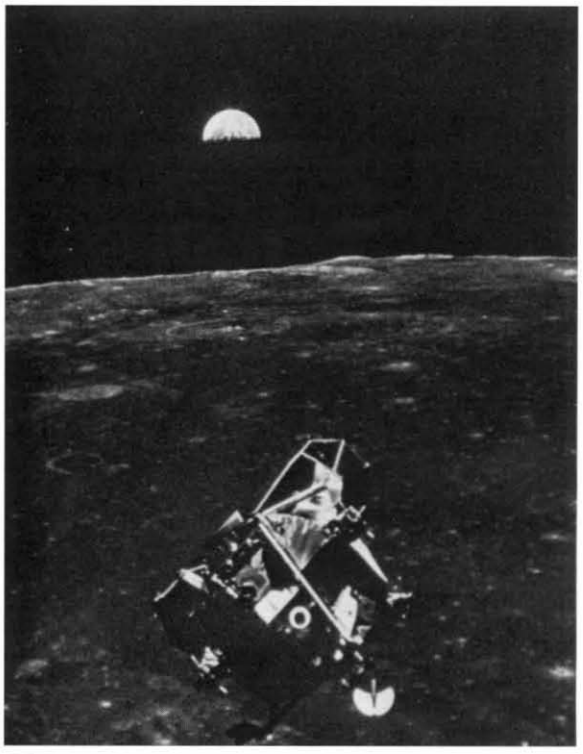
Geological explorations are made by both astronauts, after which they return to the LM to replenish their portable life support system with on-board supplies.

During their explorations, the astronauts take many photographs, collect specimens, activate experiments, and transmit verbal reports on observations to the earth.

The lunar stay lasts for about 60 hours.



R-111A

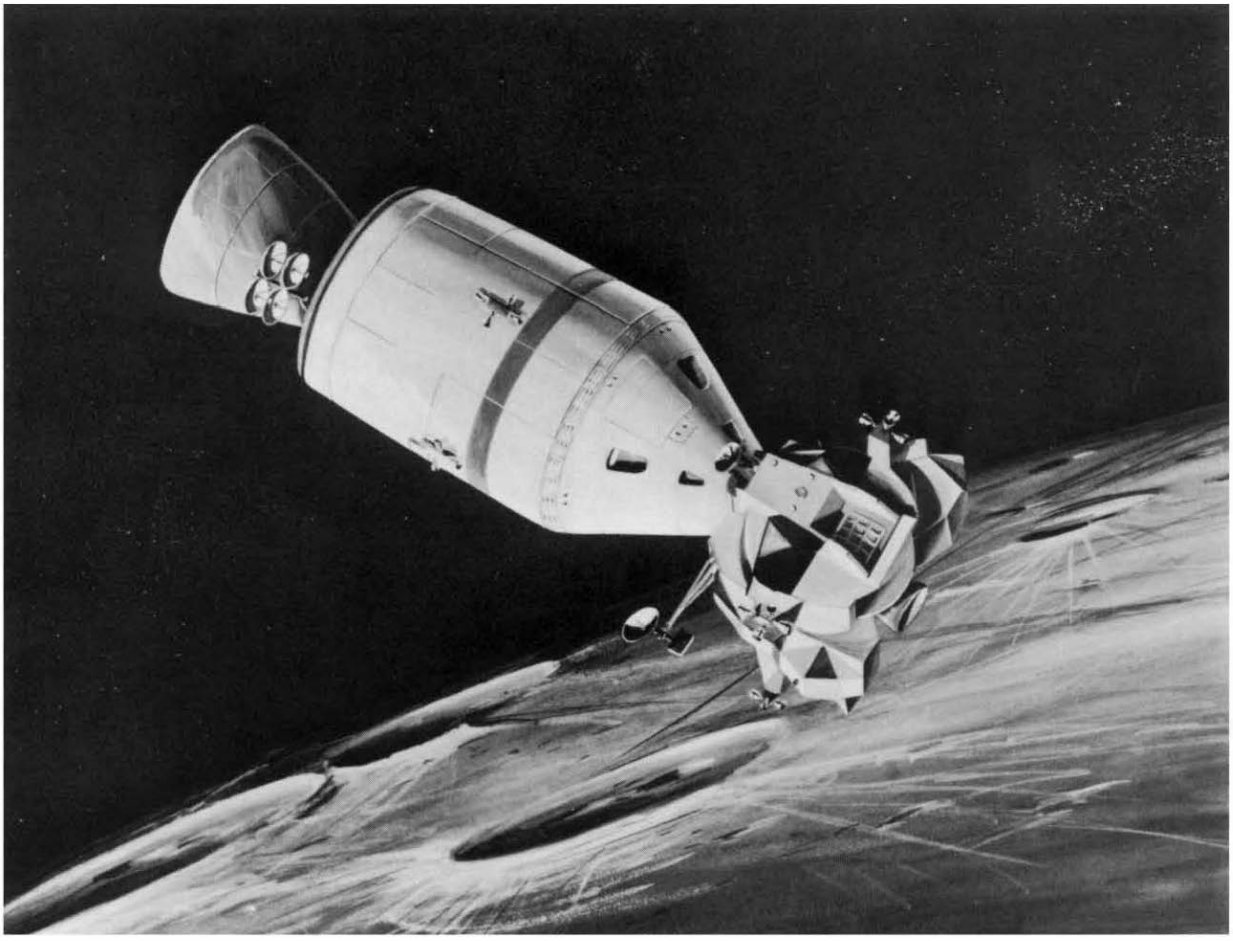


R-164

When the lunar stay is completed, the crew prepares the LM for launch and ascent to rendezvous with the orbiting Command/Service Module.

Preparation consists of a recheck of all subsystems, and the computation of relative position information for the rendezvous.

When the orbiting Command/Service Module is in the proper position overhead, the LM ascent engine is ignited for launch. The descent stage serves as a launching platform and remains on the moon's surface. Later, the ascent engine inserts the LM into a transfer orbit. Mid-course correction and rendezvous maneuvers are accomplished with the reaction control system jets.



R-112

When the LM is approximately 500 feet from the Command/Service Module, the LM Commander manually maneuvers the module to a docking attitude and increases or decreases the rate of closure until complete docking is accomplished.

Once the coupling process is complete, the two-man LM crew prepares to transfer to the Command Module and rejoin the third member of the Apollo team. Pressures between the modules are equalized, LM subsystems are turned off, and scientific equipment and collected specimens are passed into the Command Module. When the transfer is complete, the LM is jettisoned in lunar orbit and left behind. This concludes the role of the LM in the Apollo mission.

FINAL APOLLO MISSION PHASE

Following rendezvous and jettisoning of the LM, preparations are made for the return journey to earth. A checkout of the Command/Service Module's systems and computation of the transearth course occur just before firing the Service Module's engine, which provides thrust for the return trip.

As the Command/Service Module nears earth, the Service Module is jettisoned, and the Command Module – bearing the Apollo team's three astronauts – is reoriented for re-entry and final parachute descent to earth landing, thus completing the week-long lunar mission.