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MANNED SPACECRAFT CENTER

PUBLIC AFFAIRS OFFICE

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APOLLO 16

APOLLO 16 A voyage to the Moon's volcanic highlands

APOLLO 16 PREFLIGHT SUMMARY

An area of relatively smooth, hummocky or rounded and hilly highlands near the crater Descartes (pronounced day-cart) having features similar to volcanic terrain on Earth will be the landing site for Apollo 16, scheduled for launch in March 1972. The Descartes site is near the center of the visible face of the Moon — 9 degrees south latitude by 16 degrees east longitude and lies in the central lunar highlands in one of the highest regions of the earth-side hemisphere. The site is expected to yield two important cross sections of lunar composition which will help scientists fill some of the gaps in their knowledge of the Moon's structure and constructual evolution gained from previous landing missions.

The first of these cross sections is the nearby region of the Descartes mountains believed to be highland volcanics. It consists of bright, clustered, hilly and furrowed surface that extends about 60 miles from the crater Descartes. It appears to be a very viscous lava and makes up about 4 percent of the near side of the moon.

The second cross section is the highland volcanic plains which make up about 7 percent of the near side of the Moon. At Descartes, these plains are referred to as the Cayley plains.

On the Cayley plains are several large, young craters about a half-mile in diameter, comparable in size to Meteor Crater in Arizona, and from which large blocks of basin fill have been thrown out. Scientists are eager to sample this material, which they hope will provide the age of the craters and at the same time will give them the opportunity to analyze material brought up from about 600 feet beneath the lunar surface. Numerous other fresh and ancient craters of various depths which will give data relating to the different periods of the Cayley formation will be investigated, including relatively recent formations, such as the bright ray craters on the plains.

When looking at the Moon from Earth, the circular mare areas appear dark in color and the highland or mountain areas appear light in color. Scientists believe the color differences seen in rocks returned from the Moon are related to their place of origin — the lighter samples originating from the highland material and the darker ones from the mare regions. By sampling apparently volcanic material from the highlands, scientists hope to obtain light-colored volcanic material to complement the dark mare basalts returned from previous missions.

The dark basaltic material is thought to represent volcanic activity that took place relatively late in lunar history, while the light-colored highland volcanic rock is thought to have formed much earlier in lunar history. The differences in the time of formation of these two materials and the differences in their chemistries are fundamental problems yet to be resolved in reconstructing the history of the Moon.

A science station for relaying earthward continuous data on the Moon's magnetic field, surface and subsurface heating, and moonquakes will be laid out near the landing site. The radioisotope-powered station is called the Apollo Lunar Surface Experiment Package (ALSEP) and has been carried on each mis-

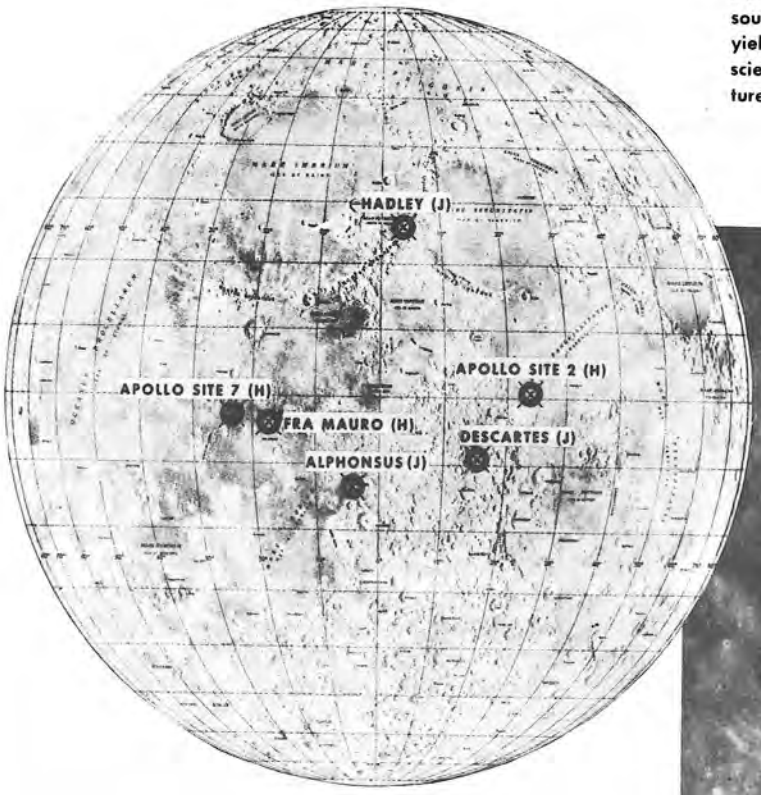
Prime crewmen for Apollo 16 (from left) are John W. Young, Commander; Thomas K. Mattingly II, Command Module Pilot; and Charles M. Duke, Jr., Lunar Module Pilot.

Young, 40, is a Navy Captain who will be making his fourth space flight. He has flown on Geminis 3 and 10 and Apollo 10. Apollo 16 will be his first lunar landing mission.

Mattingly, 34, a Navy Lieutenant Commander, has not flown in space. He was replaced as the prime command module pilot on Apollo 13 the day before launch after being exposed to the German measles.

Duke, 35, an Air Force Lieutenant Colonel, also will be making his first space flight. He was backup lunar module pilot for Apollo 13.

APOLLO SITES



Descartes is near the center of the visible face of the Moon, 9 degrees south latitude by 16 degrees east longitude. Hopefully, the site will yield two important cross-sections of lunar compositions which will help scientists fill some of the gaps in their knowledge of the Moon's structure and constructual evolution.

DESCARTES

sion, with some variations in experiments, since Apollo 12.

Apollo 16 ALSEP experiments will include a passive seismometer for measuring the frequency and strength of moonquakes, and will become the fourth in a net of seismometers – Apollo 12, 14, and 15; a magnetometer for comparing levels of magnetism in the highlands with those of the mare areas, as well as measuring the electrical conductivity of the lunar surface; and the heat flow experiment which uses probes lowered into holes drilled into the lunar surface to measure the thermal properties of the upper crust. Lunar surface experiments not attached to ALSEP include the cosmic ray detector which will gather data on the source and strength of high-velocity cosmic rays striking the Moon, and the far ultraviolet camera/spectrograph which will look outward from the Moon to scan celestial objects that either emit energy or are absorbing energy from atomic hydrogen. Other than visual or TV and camera scans, this will be the first observatory on the Moon. This observatory will be able to collect data from the universe which is not available from Earth or from near Earth orbits due to the absorption of the Van Allen belts and atmosphere.

Not all scientific investigations of Apollo 16 will be done on the Moon, for as on Apollo 15, the Apollo 16 service module Scientific Instrument Module (SIM) Bay will be crammed full of high-resolution cameras, geochemical sensors, and a mini-satellite to be ejected into lunar orbit for long-term measurements of gravitational and electrical characteristics of the Moon.

Information collected from the Descartes site will widen the knowledge of the lunar surface when it is combined with data gathered from the lunar mare (sea) sites of Apollo 11 and 12, the Fra Mauro uplands visited by Apollo 14, and the high mountains and rille or gorge region at Hadley-Apennine explored by the Apollo 15 crew.

Exploration mobility will be extended as it was in Apollo 15 by use of the lunar roving vehicle, a small four-wheeled, electric-powered car. The Apollo 16 landing crew will leave the lunar module three times during the 3 days they are on the lunar surface – each exploratory excursion lasting up to 7 hours. The command module pilot, meanwhile, will be operating the SIM Bay experiment in lunar orbit. During the coast homeward, he will swing hand-over-hand back to the SIM Bay to retrieve film cassettes from the two cameras.

The Apollo 16 crewmen are USN Capt. John W. Young, commander; USN Lt. Cdr. Thomas K. Mattingly, command module pilot; and USAF Lt. Col. Charles M. Duke, lunar module pilot. Backup crewmen, respectively, are Fred W. Haise, Jr., Stuart A. Roosa, and Edgar D. Mitchell.