The Moon landings in historical perspective

Martin McLaughlin
20 July 1999

Thirty years ago--at 4:17 p.m., American Eastern Daylight Time, July 20, 1969--Neil Armstrong and Edwin (Buzz) Aldrin became the first men to land on the Moon. The astronauts of Apollo XI were followed by ten more, in the series of six Apollo missions that made successful landings on the Moon.

A generation later, the Moon landings remain an astonishing scientific, technical and organizational achievement, an inspiring demonstration of mankind's ability to harness nature to its own purposes, through socially coordinated common effort. For the first time in humanity's million-year rise from a purely animal existence, people left the Earth, traveled to another body in the solar system, and returned safely.

It is all too easy to forget the very real dangers that were involved in the Moon landing. Especially remarkable, in retrospect, is that all the intricate navigational and communications tasks of the Moon missions were carried out before the microprocessor and in the infancy of lasers. The computers that controlled the Apollo spacecraft were built with transistors and integrated circuits, not microchips.

The Apollo missions were fiendishly complex, involving at least seven separate stages: liftoff from Cape Kennedy into Earth orbit; departure from Earth orbit and transit to the Moon; entry into Moon orbit; separation of the Lunar Module (LM) from the Apollo spacecraft and landing on the Moon; liftoff by the LM from the Moon and return to the orbiter; departure from Moon orbit and return to the Earth; and finally, reentry to the Earth's atmosphere and an ocean landing.

Failure in any one of these stages would mean, at best, aborting the mission, at worst, the loss of the entire crew. The most dangerous moment was the liftoff from lunar orbit to return to the Earth, since failure would leave the spacecraft either helplessly circling the Moon, 235,000 miles from any assistance, or crashing into the surface of the Moon.

These dangers were demonstrated in the experience of *Apollo XIII*, the only failure among the seven scheduled Apollo Moon missions. When a fuel tank exploded during the Earth-to-Moon phase of the mission, the three astronauts were forced to take refuge in the Lunar Module, abandon the entry into Moon orbit and use the satellite's gravitational attraction to sling them back safely to Earth.

Even riskier was *Apollo VIII*, the first to make entry into lunar orbit. NASA officials made the decision to attempt the lunar voyage in December 1968, two months before the Lunar Module was ready, because of concerns that the Soviet Union might carry out a similar mission first, using its new *Zond* spacecraft. If *Apollo VIII* had suffered an accident similar to the one which occurred on *Apollo XIII*, its crew would have had no lunar lander on board and hence no backup environment, and would certainly have perished.

Besides the known dangers, many risks were literally incalculable. Scientists had long believed, for example, that the *maria*, the darker, flatter “seas” which make up so much of the Moon's surface, were outward signs of deposits of minerals of much higher density than the rest of its crust. Such variations in density would produce unpredictable irregularities in the Moon's gravitational field, whose impact on an orbiting spacecraft could not be fully gauged until the spacecraft arrived.

The Moon landings were the product, not of individual brilliance or genius, but of a gigantic, sustained and highly organized collective effort. The astronauts, in the words of one chronicler of the space program, “formed the apex of a social pyramid comprising the scientific, technical, and industrial power of a whole society.”

“It took 5,000 men and women to launch a lunar landing mission from the Kennedy Space Center, Florida. Thousands more were involved in tracking the spaceship to the Moon and back. Around the world, at Canberra, Australia; Goldstone, California; and Madrid, Spain, the 85-foot and 210-foot diameter antennas of the Deep Space Network kept radio and television communications open between the Earth and the Moon.

“The creation of an apparatus to fly men to the Moon and back required the organized effort of a major fraction of society. At the peak of the Apollo program, in 1966-1967, a contractor and civil service work force numbering 420,000 persons was employed in it. This included 90,000 scientists and engineers, 20,000 industrial firms, and 100 universities”

(Richard S. Lewis, *From Vinland to Mars*, p. 212).

Contrary to the mythology of "free enterprise" and individualism, which plays such a powerful role in the ideology of American capitalism, most of the great scientific and technical advances of the 20th century have been made by such large-scale, coordinated efforts.

In a capitalist social order, where production is unplanned and anarchic, driven by the profit interests of the corporate elite, such efforts are the exception rather than the rule. Massive resources and systematic planning are not employed to abolish poverty, rebuild the cities or provide health care to all, but only to defend the interests of the ruling class against a life and death threat.

Under conditions of World War II, the United States developed the atomic bomb through the Manhattan project, a planned and organized production system greater in its size than the entire prewar automobile industry. Under the impetus of the Cold War competition with the Soviet Union, the space program became the focus of a similar effort, especially after President John F. Kennedy set the goal of a Moon landing by the end of the 1960s.

But the political impetus that the Cold War gave the space program also created the conditions for its later decline. Once the Moon landings were accomplished, and the propaganda victory over Stalinism achieved, the interest of official Washington in manned space exploration steadily waned.

Relatively little is said in the American media about this aspect of the Moon landings: how remarkably short the "era" of lunar exploration actually was—less than three and a half years. Apollo XI landed on July 20, 1969. The last men to walk on the Moon, the astronauts of Apollo XVII, returned to Earth on December 19, 1972, while Richard Nixon was still in the White House, the Vietnam War was still raging, and before half the world's current population were born.

The retreat from the Moon began even before the last Moon landing, as NASA's budget was slashed and the enormous work force that created Apollo was reduced by more than half. In September 1969, in the flush of enthusiasm after the first successful landing, a presidential study group released a report on the future of the space program, which proposed steady progress towards a manned mission to Mars by the early 1980s. Within months these ambitious proposals were being abandoned, one by one. All manned space missions since 1972 have been limited to Earth orbit. There are no plans for a return to the Moon in the foreseeable future, and it is today considered unlikely that a Mars mission will be attempted before the year 2020.

It is not just a matter of the ebbs and flows of the Cold War, however, which put an end to the initial phase in the manned exploration of space. Further advances in this sphere—whether the creation of large-scale space stations, the systematic exploration and development of the Moon, or the initial exploration of Mars—require the mobilization of resources beyond those available even to the United States, the richest and most technologically advanced country.

Space exploration as a practical matter is inherently a global affair, requiring the cooperative effort of all humanity. This is true even of the most elementary technical tasks, such as maintaining continuous communications links with faraway spacecraft, which can only be done through coordinated arrays of radar stations around the world. It is even more true of the prodigious scientific and technical obstacles posed in the conquest of the solar system.

The last 25 years have seen episodic efforts to coordinate the exploration and exploitation of space on an international basis, from the Apollo-Soyuz mission to the recent collaboration between the US Space Shuttle program and the Russian Mir space station. But these efforts, however much welcomed by the scientists and technicians involved, have always been subordinated to the conflicts between the rival nation-states, each seeking to use the knowledge gleaned from space to improve their weapons systems or gain a competitive advantage in the capitalist marketplace.

When Neil Armstrong and Buzz Aldrin landed on the Moon, they brought with them a token of the divisions on Earth. It was an American flag which, since the Moon has no atmosphere, had to be planted with a wire so that it would seem to flutter in a nonexistent breeze.

These unresolved contradictions—collective social effort vs. private profit, global cooperation vs. nationalistic chauvinism—are at the root of the stagnation, not only of space exploration, but of all human culture. Their resolution is only possible on the basis of a turn to the socialist reorganization of our planet.