Fifty years since the first Moon landing

20 July 2019

Fifty 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. A television audience estimated at 650 million people watched as the two Apollo astronauts climbed out of the Lunar Module and became the first human beings to set foot on another body in our solar system.

Four days later, Armstrong, Aldrin and Michael Collins completed their mission with a successful splash landing in the Pacific Ocean, returning home safely from their 240,000-mile (387,000 kilometer) journey to Earth's nearest neighbor.

A half-century later, the first Moon landing remains an epoch-making scientific, technical and organizational achievement, an inspiring demonstration of two powerful truths that in the present era are constantly under attack by reactionary and irrationalist trends, from religious fundamentalism to post-modernism: 1) Human reason is capable of understanding the world, through the development of scientific knowledge of its inherent laws and objective properties; and 2) Using technology based upon science, and with a socially organized common effort, humanity can harness nature to its purposes.

In remarks delivered from space as Apollo XI neared Earth on its return trip, on the eve of the re-entry into Earth's atmosphere, perhaps the most dangerous segment of a perilous mission, Armstrong paid tribute first of all to "the giants of science who have preceded this effort," and gave "special thanks to all those Americans who built the spacecraft; who did the construction, design, the tests, and put their hearts and all their abilities into those craft…"

Copernicus, Galileo, Kepler, Newton, Faraday, Maxwell, Einstein: these were the intellectual pioneers of the Moon landing. Then follows the array of brilliant engineers who solved countless technical problems involving a seven-stage process of traveling from the surface of the Earth to the surface of the Moon, and back again.

As Charles Fishman's recent account of the Apollo program describes it, in May 1961, when President John F. Kennedy called for a Moon landing before the decade's end:

> NASA had no rockets to launch astronauts to the Moon, no computer portable enough to guide a spaceship to the Moon, no spacesuits to wear on the way, no spaceship to land astronauts on the surface (let alone a Moon car to let them drive around and explore), no network of tracking stations to talk to astronauts en route. On the day of Kennedy's speech, no human being had ever opened a hatch in space and gone outside; no two manned spaceships had ever been in space together or ever tried to rendezvous with each other. No one had any real idea what the surface of the Moon was like and what kind of landing craft it would support… (Charles Fishman, *One Giant Leap*, 2019 Simon & Schuster, p. 6)

Human experience in outer space up to that point was limited to the orbiting of the Earth by Soviet cosmonaut Yuri Gagarin and the sub-orbital flight of American astronaut Alan Shepard, in April and May of 1961 respectively.

Once under way, the Apollo program became a vast social enterprise, absorbing more than half the research and development spending in the United States. It was three times the size of the Manhattan Project, which developed the atomic bomb, ten times the scale of the effort required to build the Panama Canal. The account already cited notes:

> In the three peak years of Apollo's employment, more Americans were working on the Moon mission than were fighting in Vietnam. In 1964, 380,000 people were already working on Apollo, and just 23,300 were deployed in Vietnam. In 1965 Apollo had 411,000 employees, and there were 184,300 U.S. soldiers in Vietnam. Even in 1966, when U.S. forces in Vietnam doubled to 385,300, back home there were 396,000 Americans working on Apollo...
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> In the three peak years of NASA employment—1964, 1965, 1966—NASA and Apollo were bigger in terms of staff and contractors than every company on the Fortune 500 except #1, General Motors, with more than 600,000 workers. NASA was bigger than Ford and GE and US Steel. (Ibid., p. 21)

Fishman calculates, "Every hour of spaceflight required more than 1 million hours of work on the ground—an astonishing level of preparation."

One paradox of the Apollo program was that the same political imperative that launched it—the Cold War conflict between the United States and the Soviet Union—created the conditions for its erosion and ultimate demise. At the same time, the enormous technological achievements were, under capitalism, continuously subordinated to war and destruction.

The initial Soviet space successes, beginning with the 1957 launching of Sputnik and culminating in the first man in space, Gagarin, in 1961, were viewed by US imperialism as a deadly threat. Missiles that could put satellites into orbit could carry atomic weapons.

Kennedy campaigned for the presidency in 1960 on the "missile gap" with the Soviet Union. He delivered his message to Congress calling for a Moon landing only one month after the humiliating debacle at the Bay of Pigs, when a US-backed expeditionary force of Cuban exiles was defeated and forced to surrender by the Soviet-backed Castro regime.

Kennedy and his vice president, Lyndon Johnson, who continued the Apollo program after JFK's assassination in 1963, were interested primarily in the political and strategic benefits of the "space race" against the USSR. The Moon was a priority for purely earthly reasons, having nothing to do with the historic character of the effort or its scientific significance.

The comparative figures for NASA employment and Vietnam deployment are revealing: by 1967, the demands of the escalating war absorbed so much of America's resources that both the social reforms initiated as part of Johnson's "Great Society" program and the race to the Moon initiated by Kennedy began to feel the impact.

Moreover, once the Moon landing had been accomplished, giving the United States a huge propaganda victory over the Soviet Union, the leaders of American imperialism lost interest. All six Moon landings were carried out over a three-year period, within the first term of one US president, Richard Nixon. After 1972, politically beleaguered by the Watergate scandal and facing defeat in Vietnam and a mounting global economic crisis rooted in the relative decline of American capitalism, Nixon downgraded the space program, rejecting proposals for a permanent Moon base or any further flights. His successors have followed suit.

This history suggests another paradox: while the Apollo program accomplished historic advances using technology that would be considered primitive today, the enormous developments in science and technology over the past 50 years have not led to any resumption of the manned exploration of the solar system, or even the Moon.

The Apollo Guidance Computer, which operated the spacecraft as astronauts inputted instructions, was the first computing device to make use of integrated circuits. All previous computers were built with transistors, too bulky and unreliable for use in space. The AGC had 73 kilobytes of memory, including only 3,840 bytes of RAM (random access memory), less than today's microwave oven.

Apollo helped ignite the digital revolution, particularly by the development of precision manufacturing of integrated circuits, which boosted the reliability of microchips from the aviation standard of one failure in 10,000 to a staggering one failure in 312 million for chips used in the onboard computers and other NASA systems.

The scientific and technological advances of the past half-century have enabled NASA to accomplish extraordinary feats in unmanned exploration, with robot space probes reaching every planet and gaining more new knowledge of the solar system in the past 40 years than in all previous history.

But in manned space exploration, NASA's horizons were lowered to near-Earth orbit. All efforts were focused on the Space Shuttle, useful for delivering heavy military surveillance satellites to the proper orbits and building the International Space Station. After the 1986 Challenger and 2003 Columbia disasters, the reusable vehicle, based on what was by that time extremely outmoded technology, was phased out. Today, US astronauts are lifted to the International Space Station on Russian rockets, while a US rocket remains on the drawing board.

The current revival of space-related activity is the product of intensified geopolitical tensions. The United States, Russia, China, India, France, Britain, even Israel and Iran, are all engaged in stepped-up missile launches and satellite deployment. Like the "space race" of the 1960s, this is driven by the direct competition of rival powers who regard space as the "high ground" in the next series of world wars.

The Trump administration, as in every other sphere, expresses this most crudely, with the president proudly announcing the creation of a military arm, the Space Force, to operate initially as a unit of the Air Force, but clearly intended to become a major military institution in its own right. The action is in direct violation of the international consensus established in 1958, after Sputnik, that space should not become a theater of military operations. All the various capitalist powers are breaking with this understanding, developing, for example, missiles to shoot down the satellites on which their rivals depend for global positioning data and other support for military operations.

And as always with Trump, there is money to be made for the favored few. Dozens of private companies are swarming to offer their services as subcontractors for the new US push into space, aiming to cash in on a new growth area of federal procurement.

Even in the heyday of the Apollo program there was an inherent tension between the capitalist drive for profits and mission safety. The following grim joke has been attributed to various astronauts—Alan Shepard, John Glenn, or Gus Grissom: "My life depends on 150,000 pieces of equipment—each bought from the lowest bidder." Grissom died in the tragic fire that took the lives of three astronauts in January 1967.

Today the profit drive is more brazen and pernicious. The *Wall Street Journal* reported Thursday on the gold rush atmosphere inspired by Trump's call for a Moon mission by 2024 (before the end of a second term in office). The *Journal* quotes one advocate of the private space ventures, Rick Tumlinson. "'If the government is going to pump billions of dollars into a return to the moon,' says SpaceFund's Mr. Tumlinson, it must promote private-sector initiatives along the way. 'If not, I will deem it a failure—and so will history.'"

So if humanity returns to the Moon, but no corporation makes a profit from it, the effort is a failure. What an indictment of capitalism—from the mouth of one of its own propagandists.

Like all historically progressive tasks, humanity's advance into space depends upon the overcoming of the barriers erected by the profit system: private ownership of the means of production, and the division of the world into rival and competing nation-states. In other words, it depends on the development of an independent movement of the world's working class, based on a socialist program.

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