A Real Revolution in Space

by Michael James Carr

> Now, the present system …, as long as we try to operate according to the rules of an international monetary system, the United States is now hopelessly doomed. However, under our Constitution, with a President, and with the backing of a Congress which supports him in this, the United States can turn on a dime: Precisely such is the key to my proposed legislation.
>
> *—Lyndon LaRouche in an October 10, 2007 webcast*

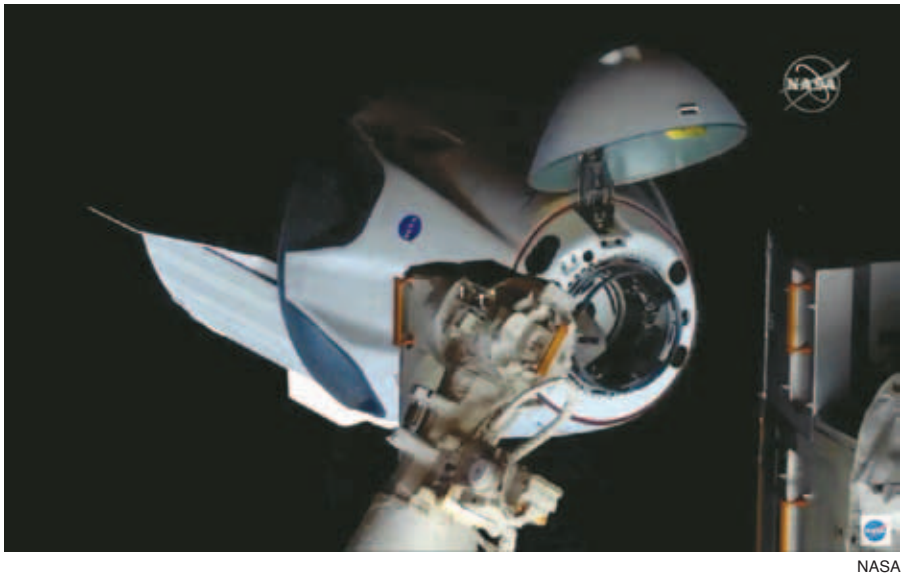
June 19—With the May 30 successful launch of the crewed Dragon *Endeavour* to the International Space Station (ISS), the United States demonstrated the truthfulness of LaRouche's outlook. The United States can be resurrected out of the collapse that the City of London and Wall Street financial forces have imposed upon it. To better understand the future, we must reflect a bit upon the past.

During the 20th and early 21st Century, there were only two short periods in which the American System of economics—of Alexander Hamilton, Henry Carey, Abraham Lincoln, Lyndon LaRouche—has been able to prevail over the British attempts to suppress it which have continued now for more than 300 years. The Franklin Roosevelt and John Kennedy administrations, while far from perfect, were times of the use of Hamiltonian national credit and support for scientific and industrial progress. In particular, the scale of efforts involved in Kennedy's Apollo Project portended a move towards an unending stream of technological revolutions with infinite possibilities. British imperialism could not tolerate this.

In 1963 Kennedy was killed. After that assassination, Lyndon LaRouche picked up the torch. He had no official authority, but he had a commitment to creating a better future. He soon identified the British hand behind the cultural warfare aimed at America.

Strangulation of NASA and the Future

In 1967 the London Tavistock Institute (think-tank of Britain's foreign intelligence agency, MI6) released the Rapoport report, which decried the growing interest of young people in science and engineering due to the excitement about space exploration and travel. It demanded efforts to destroy that optimism and shut down the U.S. space program. In that same year, 1967, large-scale layoffs began in the aerospace industry.



NASA

The SpaceX Dragon's Endeavour*, the crewed capsule, autonomously docking with the International Space Station, May 31, 2020.*

In 1968, war, assassinations, riots, were used to

spread pessimism. The first Moon landing in 1969 was treated as an amazing *stunt*, not as the beginning of a revolutionary cislunar (the Earth-Moon space) economy. The propaganda campaign ("We have too many problems here on Earth to be spending so much money in space") to shut down NASA and scientific progress was already in high gear even as longer and longer lunar stays covered more and more territory and performed more and more important research.

The London-orchestrated propaganda pushed the idea that science was responsible for war and suffering while industry was responsible for pollution and desecration of "Mother Earth." The President Nixon who oversaw the return of Apollo 11, allowed the NASA budget to be cut down radically. Apollo would be shut down after the 6th Moon landing. Apollo and Saturn parts would be used to make a short-term space station and a docking with a Soviet Soyuz spacecraft in orbit, but the fount of progress was being shut down. Nothing new would be built!

Nuclear technology was targetted for shutdown. High-speed rail and supersonic transport projects were targetted. Tens of thousands of scientists, engineers and workers were being laid off. Young people studying science and engineering were left high and dry—their prospects dimmed towards insecurity and poverty—because there was no credit system to back them up; we didn't have a policy to promote the development of industry. We had a policy to shut it down and go back to the colonial status of a subject colony. The future of American-led progress for the world was just being shut down!

To revive NASA and the future that was being strangled, LaRouche and other interested people fought to build Wernher von Braun's reusable two-stage shuttle. The opposition to this proposal engendered such haggling that agreement was reached only with nearly impossible conditions. What Imperial Finance would tolerate to be built was far from the original conception of von Braun. In fact the expectation was that it would fail to fly.[1]

1. It is reminiscent of the case of Billy Mitchell. He was reluctantly permitted to demonstrate that aircraft were capable of sinking a battleship via bombardment. However the rules of the demonstration were set such that he was not permitted to use a bomb powerful enough to actually sink the ship. He was set up to fail! When he disobeyed the rules and used an adequate bomb to successfully sink the ship, he was court-martialed!

So it was greeted as a miracle when the courage of astronauts John Young and Bob Crippen, along with the determination of engineers to do the impossible, cobbled together something that actually flew. But it was dangerous, delicate, constricted to low Earth orbit (LEO), and expensive to operate. In the middle of this dark time, Lyndon LaRouche put forward a forty-year timeline for colonization of Mars which, still today, is key to the transformation of the productive power of civilization as a whole, and guides revolutionary thought in space research.

The Shuttle System

Despite the sabotage, the Shuttle System succeeded in many notable ways: It put most of the International Space Station into orbit, it launched and maintained the Hubble Space Telescope, it allowed for a new understanding of aerodynamics up to Mach 25, and it kept sending back amazing video and photography that continue to inspire people around the world with the idea that man can do almost anything! Of course, this system should not have been shut down until a better replacement was available. But the combined take-down by presidents Bush and Obama was "crowned" by Obama's public abandonment of manned space travel. That president, who said "We already went to the Moon," also showed his Malthusian worldview when he told a Town Hall meeting in South Africa in 2013:

> Ultimately, if you think about all the youth that everybody has mentioned here in Africa, if everybody is raising living standards to the point where everybody has got a car and everybody has got air conditioning, and everybody has got a big house, well, the planet will boil over—unless we find new ways of producing energy.

He had already said, in Virginia in 2008, "We don't need any fancy fusion power."

When shuttle operations were shut down with the last flight in 2011, again the Empire, which of course is always betting, bet that the infant Commercial Crew Program (CCP) to build private spacecraft for getting people to and from orbit would fail. Certainly the CCP was not focussed upon development of the *revolutionary technologies* necessary to really make human access to LEO a simple, cheap, routine process. The disease of monetarism, love of money, was put in the

driver's seat. So, in the sense that it was focused upon use of "off the shelf" technologies, it was *designed to fail to produce the revolutionary technologies really necessary to assure better access to space*, and thereby fail to have the spinoff effects into the rest of the economy which more than pay for the cost of developing revolutionary technologies.

Despite the temporary insanities of recent decades, from the long perspective, the United States has accomplished a very bumpy upward trajectory for its people over the course of its history. The upward bumps were powered by two main factors: (1) periodic implementation of American System credit, tax, tariff and industrial development policies, and (2) what Lyndon LaRouche identified as the development of *labor power*. LaRouche's concept encompasses both the discovery of new scientific principles (which always are first made inside a single mind), and the insight and drive to apply the new discoveries to the productive machinery of society—*technological progress*.

NORAD and USNORTHCOM

Elon Musk

Among scores of technological revolutionaries worldwide, an unusually high number were Americans, and a significant percentage of those were immigrant Americans, such as Ottmar Mergenthaler, inventor of the revolutionary Linotype machine (look it up!), John Ericsson (*U.S.S. Monitor*), Wernher von Braun who organized America's first successful space launches, John Augustus Roebling (Brooklyn Bridge), Andrew Carnegie, Nikola Tesla, and many others. So, it was not unusual for a young person with big ideas to be drawn to the United States even during times of self-destructive general economic policies. Such is the case with Elon Musk, founder, CEO, CTO, and majority owner of SpaceX.

Who Is Elon Musk, and What Is SpaceX?

There is a reason that NASA Administrator Bridenstine said the other day that we want to inspire hundreds of new Elon Musks. Like entrepreneur/engineers before, he deliberately set out to transform civilization for the better. As a boy in South Africa, he was ridiculed as a bookworm. As a young person, he identified three areas of rapid change which offered him an opportunity to make a real contribution: (1) making civilization multiplanetary, (2) developing the possibilities of the internet, and (3) developing better power sources than fossil fuels. Born a few months before the last Moon landing, early on, he set his sights on emigration to America, land of opportunity and bumpy revolutionary progress.

Of course like most people, he has made plenty of mistakes and is going in the wrong direction by pushing the idea that solar cells can power civilization, or in thinking that his next chemical-rocket-powered spaceship will be able to land people on Mars; however, despite heaps of ridicule, the 48-year-old has transformed three major areas of life for the better so far: made access to space much easier with revolutionary technologies, transformed the world auto industry with the introduction of the Tesla Model S electric sedan, and is now in process of bringing high-speed, space-based internet services to nearly every inhabited remote spot on Earth with the SpaceX Starlink system.

After selling his portion of PayPal, which he had been instrumental in creating, Musk decided to put one third of his resultant fortune into a project to help NASA and reignite interest in space development.

In 2001, he adopted the idea of landing a little greenhouse on Mars (as the *Chang'e 4* did in 2019 on the far side of the Moon) and made several trips to Russia to attempt to buy a couple of old Russian rockets to launch his greenhouse. The Russians did not take him seriously (despite the fact that he had Mike Griffin along, who would soon become the NASA Administrator). So, in 2002 he set up SpaceX with a plan to mass produce a small rocket, the Falcon 1, to launch small satellites. If he could succeed, perhaps he could develop a low-cost capability that would be able to help NASA in some way, and further his commitment to making humanity multiplanetary.

To summarize a fast-paced process, here is a timeline of SpaceX history:

2002: Space Exploration Technologies (SpaceX) founded.
2006: First Falcon 1 launch failed.
2008: After two more failures, and on the brink of company dissolution, the last of Musk's money was put into a fourth launch attempt, which succeeded in reaching orbit. The Falcon 1 became the first privately funded liquid-fueled rocket to reach orbit.
2008: December 23, NASA awards an International Space Station (ISS) resupply contract to SpaceX.
2010: First successful Falcon 9 launch.
2011: Wins NASA contract to build Crew Dragon vehicle to send astronauts to the ISS.
2012: First launch of the unmanned Dragon supply vehicle to the ISS.
2015: First successful Falcon 9 first stage return landing near launch pad.
2016: First successful Falcon 9 first stage return landing on a drone ship (requiring less fuel than landing at the launch site).
2017: First recovery of a payload fairing.
2020: Became the operator with the most satellites in orbit: the Starlink system.
2020: First of NASA's Commercial Crew Program contractors to launch people to orbit on the Crew Dragon spacecraft.

You see from this history that, over time, in addition to a great many commercial launch contracts, SpaceX won some NASA contracts. However, SpaceX's objective was not the winning of contracts, not profitability. SpaceX was founded to make civilization multiplanetary. That requires cheap, routine access to orbit. So revenues were turned back into research and development. In its short history, the Falcon 9 system has undergone rapid improvement and revolutionary upgrades. Like Henry Ford's original automobile company, as much as possible, SpaceX seeks to produce all of its parts and product in-house, using the newest, most advanced manufacturing technologies.

So, in 2011, when SpaceX was awarded a contract to develop a system to get astronauts to the ISS, NASA got quite a bargain. Instead of failing to deliver on the contract, (as the Empire had hoped), NASA got unexpected returns: reusable first stages and payload fairings, and multiple improvements actually leading to the massive decline in the cost of access to orbit. So much so, that commercial industrial production in orbit and on the Moon is now in the immediate future.

NASA

An artist's rendition of SpaceX's proposed Starship, a crewed lunar lander.

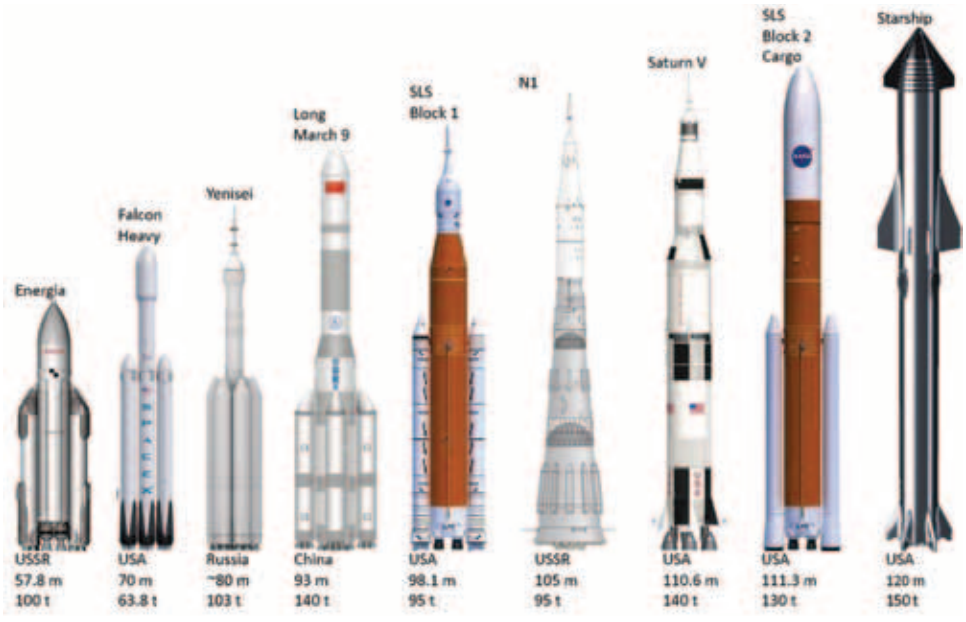
Space X, Today and Tomorrow

The Falcon 9 rocket has been successfully launched in 87 of 89 attempts over 10 years. It is expected to launch over 35 times in 2020 and over 50 times in 2021. Every mission is unique, so it is difficult at this time to quantify and compare the costs of various systems (especially since some figures include R&D and some only include operating costs). However, some published figures should give a rough idea of the change which is upon us: from 1970 to 2000, typical freight-to-orbit costs were around $18,500 per kilogram; typical costs for a Falcon 9 freight launch are around $2,720 per kilogram. It is a story much like the story of Henry Ford's Model T.

But better than trying to quantify the change in money terms, the process of getting cargo and people into orbit is just becoming a smoother, simpler, more automated and autonomous process.

Right now SpaceX is developing its next rocket/human spacecraft combination, the fully and rapidly reusable Superheavy/Starship combination, which will have payload-to-LEO capability in the same range as that of the Saturn V or the new NASA/Boeing Space Launch System. The Superheavy is the first stage and the Starship is the spacecraft, although the entire system is also known as the Starship. Work on the Starship is accelerating towards production of two per week by the end of 2020. SpaceX aims to get operational launch costs for this system down to $2 million a flight.

While this system on its own will not be able to fulfill Musk's dreams of directly flying people to Mars, it will



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Comparison of super heavy-lift launchers, capable of putting 50 metric tons or more into orbit—past, present, and future. Note the SpaceX Starship at right and the two versions of the NASA/Boeing Space Launch System (SLS) in orange. Next year, the Block 1 version will launch an Orion spacecraft around the Moon.

be very useful in building up the infrastructure which Lunar and Mars human colonization will require. In May, SpaceX was one of three company teams that won NASA contracts to further develop Lunar Lander proposals. The SpaceX design is a modified Starship.

The team Musk has assembled at SpaceX is primarily of young people, with a few older, experienced people from other parts of the NASA/aerospace community. In the hiring process, little attention is paid to degrees or "academic credentials." What is sought is people with demonstrated abilities in independent construction or creation. The aim of LaRouche PAC's proposed Space Civilian Conservation Corps, or Space CCC, is to bring forward such capabilities in millions of young people, in order to proliferate the type of revolutionary progress underway now at SpaceX throughout the economy more generally. If you are a young person, seek out such opportunity. If you are older, withhold your blanket criticisms of young people; SpaceX is showing what young people can do.

More New Spacecraft Point to a Bright Future

So what do these changes mean to you, or to a poor young person out on a rural farm or village on the other side of the world, for example? The immediate change will be that the SpaceX Starlink array of 12,000+ tiny LEO communications satellites will bring affordable high-speed internet service to every sparsely inhabited part of the planet, from the Outback to the Sahara, to the Yukon. This service will begin this year in North America and rapidly cover the world.

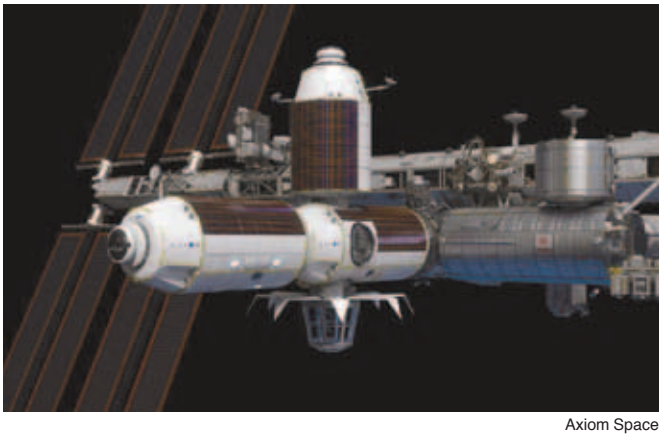
There's a huge amount of future activity coming up immediately. There's going to be another unmanned test launch of the Boeing Starliner atop a United Launch Alliance Atlas V this year. If all goes well, it will join the Crew Dragon as a third option for crew transfers to the ISS. It is expected to work well, but will probably be more expensive than the Crew Dragon system. In any case, NASA is determined to maintain multiple systems for access to LEO, so that even if one system is grounded to solve a problem, NASA is never again left without an American human launch capability. Nonetheless, NASA and Roscosmos, the Russian Space Agency, will return to swapping seats on vehicles depending upon crew and flight scheduling. Sometimes Americans will still ride Russian spacecraft, and sometimes Russians will ride American spacecraft.

Next year, as part of the Artemis program, the giant NASA/Boeing Space Launch System (SLS), now undergoing testing, will launch the NASA/Lockheed Martin Orion spacecraft on an unmanned test mission around the Moon and back. This is the system that will land astronauts back on the Moon in 2024.

So, after nine years with no direct way to get people into space, the United States is about to have three manned spacecraft systems in operation. Also noteworthy next year: The Sierra Nevada Dream Chaser will start carrying cargo up to the ISS. While its contract with NASA is for unmanned cargo missions, Sierra Nevada also intends to build a manned vehicle. This lifting body design offers the unique capability of landing on a runway, unlike the Crew Dragon or the Starliner, which land under parachutes—the Crew Dragon at sea and the Starliner on land. We have a long way to go before achieving the ultimate vehicle, but the Dream Chaser will be another step in that direction.

India and China are also going to fly new manned

FIGURE 1



Axiom Space

Axiom Space

Above, an artist's depiction of three Axiom Space manufacturing modules, attached to the ISS. At right, several Axiom Space manufacturing, habitation and power modules, separated from the ISS and functioning as an orbital factory.

spacecraft in the next two years, and China will start building a space station next year, using a version of the Long March 5 rocket. The new Chinese spacecraft has the international docking adapter system, enabling China to be integrated with the rest of the international space community, if we straighten out the political mess we have with some Imperial operatives in Washington.

The New Multiplanetary Economy

Earlier this year, a company called Axiom Space with many experienced ISS project people in leading roles, signed an agreement with NASA to start tests of various manufacturing capabilities aboard the ISS, and then to start adding modules to the ISS strictly for private space manufacturing projects. They have identified—as targets for space manufacturing in orbiting space stations or space factories—fiber optics; higher strength, lower-weight alloys; satellites; biomedical research components such as protein crystals; growth of organs and tissues in space, with a sort of biological 3D printing capability; and micro-encapsulation for pharmaceutical and medical purposes.

As manufacturing technologies and systems are proved out, Axiom will undock clusters of modules from the ISS to form separate *orbital factories*, **Figure 1**, tended by people and supplies sent up and returned by the commercial transportation systems now coming on line.

Another company, Bigelow Aerospace, which already has a test inflatable module, **Figure 2**, installed on the ISS, has built prototype inflatable space stations for industry or space tourism. Now that the cost of getting people into orbit is coming way down, it will be able to get customers to contract for launch of its stations.

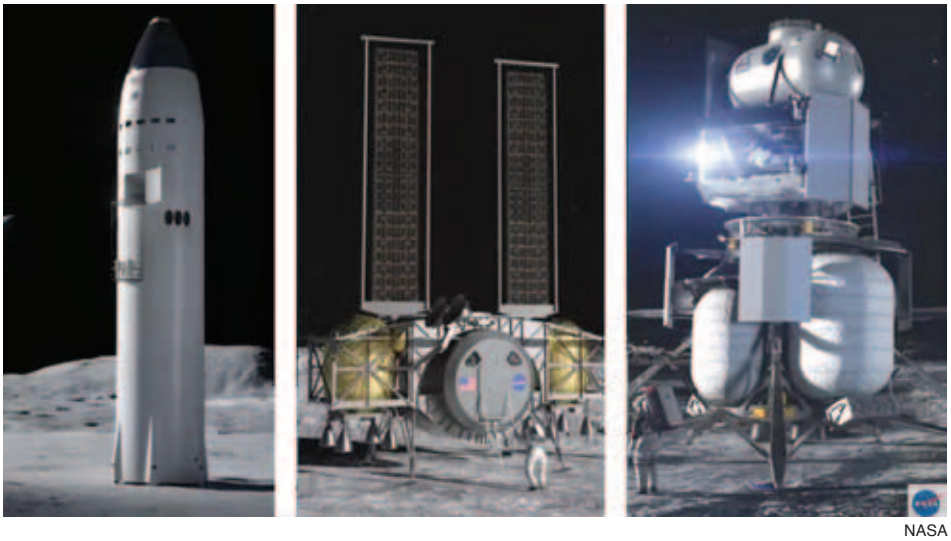
Picking up upon *some* of LaRouche's

FIGURE 2

NASA/Bill Ingalls

NASA has been discussing potential partnership opportunities with Bigelow Aerospace for its inflatable habitat technologies.

ideas, and struggling to wrest control of the American economy and culture from the City of London/Wall Street Imperial system of mass impoverishment and pessimism, President Trump in his Inaugural Address moved to redirect a constrained NASA towards human exploration of the Moon and Mars. One of the main results of the redirection is the Artemis program.

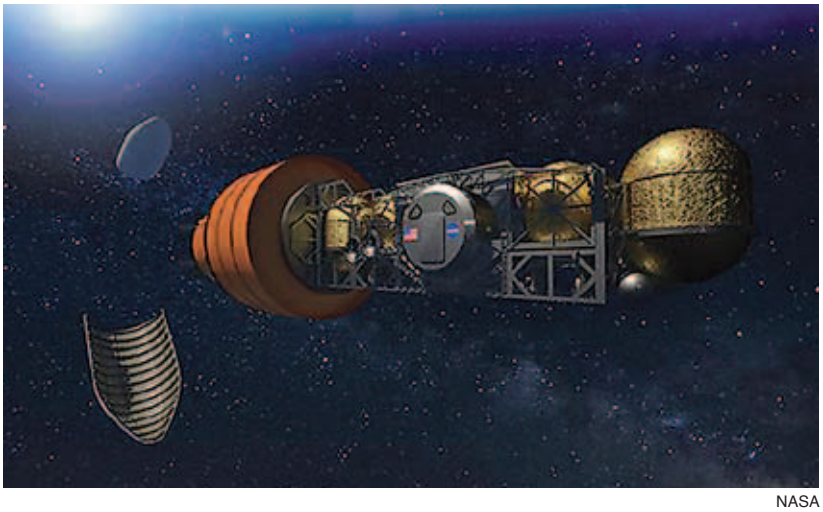


NASA

Three companies were granted development funding for the Artemis crewed lunar landing system—SpaceX (left), Dynetics (center) and Blue Origin (right).

As part of Artemis, NASA is planning to build a Lunar-orbiting, man-tended space station called the Lunar Gateway. It will be a staging point to accumulate cargo, fuel, and systems for operations going to and from the surface of the Moon or Mars. Several contracts have already been let. NASA is still negotiating with international partners for hardware contributions to the project. It is expected that many of the ISS partners will contribute hardware and services.

In May, NASA signed contracts for 10-month studies of three different human Lunar lander proposals from three different teams of companies—one team led by Blue Origin, one by Dynetics, and the aforementioned SpaceX team with a Starship derivative. Each is radically different from the other two. Each has positive and negative aspects to its design. At least one, but probably two, will be contracted for construction by NASA. The first goal is a human landing by 2024.



NASA

Artist's depiction of the Dynetics proposal for a crewed lunar lander, shown ejecting empty exterior propellant tanks.

Over time the same approach taken with commercialization of LEO, will be applied to the Moon. The Moon is rich in metals, Helium-3 (the perfect fuel for fusion power and fusion rockets), and water for human use and rocket fuel. The one-sixth gravity of the Moon as compared to Earth, makes it an ideal place for building the infrastructure not only for the surface of the Moon, but also the infrastructure for LEO and spacecraft heading to Mars.

Mars

Next month the United States will be launching the *Perseverance* rover to Mars, which is an updated version of the *Curiosity* rover already roving there. It will also have aboard the little Martian helicopter called *Ingenuity*. Second, also in July, *Tianwen-1* a Chinese Mars rover will launch. Third, the United Arab Emirates' *Hope* orbiter for Mars is being launched atop a Japanese rocket this summer. It is primarily designed to study Martian weather. Over time, civilization is building up quite an impressive infrastructure on and around Mars.

However, sending people to Mars via the same kind of chemical propulsion used for robotic systems, entailing trips of seven months even on the least time, least energy, transfer orbit—which is only available approximately every two years—is not a viable proposal. Even discounting the effects of an extremely hazardous deep-space radiation environ-

ment, think of the difficulties astronauts have in regaining muscle strength after long duration stays on the ISS. Imagine landing on Mars in that condition.

To send people to Mars, we are going to need fusion power. Even fission-powered nuclear thermal rockets (NTRs), with around twice the specific impulse (or push per unit propellant) of chemical rockets, will not suffice. We are going to need continuous rocket thrust throughout the trip, which can only come with energy sources as dense as fusion power. Serendipitously, as the Italians say, "the cheese has fallen right on the macaroni." The Moon has been collecting Helium-3 deposited by the Solar Wind bombardment over the eons. Helium-3, extremely rare on Earth, is the perfect fuel for fusion rockets and fusion power in general!

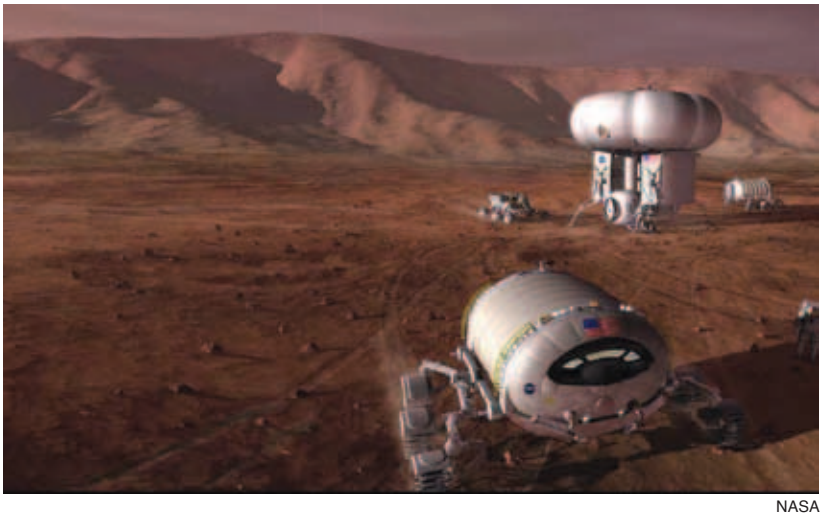
As we process the Lunar regolith, we will extract the water, metals, and Helium-3 necessary to build Krafft Ehricke's Selenopolis, but also to export Helium-3, metal fabrications, Oxygen, Hydrogen, and Lunar agricultural products. These will go to Lunar orbit, back to low Earth orbit, or to the spacecraft that will head off to Mars. The Moon is the perfect place to create the provisions and bulk equipment necessary for the entire field from low Earth orbit to the surface of Mars, because *very little energy is required to move mass from the Lunar surface to any other destination in space*.

Beyond Artemis, we will need to send complex robotic systems to the Moon to begin building a base and begin mining, manufacturing and agriculture. So in the medium term, the bulk products of Lunar mining and agriculture will begin to pay for the complex robotic and other imports from Earth. Over time the balance of trade will begin to create a self-subsisting economy on the Moon as part of a broader cislunar economy. Even before this relative economic equilibrium is reached, the Moon will provide the fuel and other bulk provisions necessary for the early development of Mars.

None of this is possible yet. The advances represented by the Falcon 9 and Crew Dragon are important steps forward. The SpaceX Starship will represent another big step forward, but certain additional actions are required to be taken now to ensure ultimate success in developing the space frontier. In the drive to implement President Trump's Artemis program in this decade, we must not short-change the work on the future technologies that will allow Artemis to seamlessly lead to Lunar and Martian colonization in the 2030s and beyond.

The Necessity for Fusion Propulsion

Fundamentally, breakthroughs in propulsion technology orders of magnitude greater than those so far achieved will be required. It is still too difficult and expensive to get to LEO and the Moon, not to mention Mars. As *EIR* has previously reported, small enterprises exist with infant technologies but great potentials. We are fortunate that some millionaires and billionaires have put their own money behind some of these projects. However, just as with SpaceX, NASA contracts and grants on a large scale will be required to bring the new technologies to fulfillment of their inherent potentials. These are the most profitable investments a government can make. And government-sponsored basic research must be greatly expanded, especially including *construction of large-scale physical experimental devices* (not studies derived from computer simulations) at the national laboratories and universities.

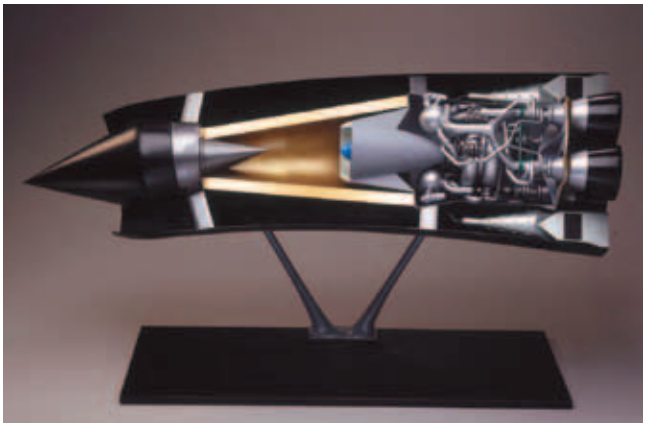


NASA

An artist's rendition of early human exploration operations on Mars.

Federal investment in fusion research has been cut even below the already low levels of the 1970s. This must be reversed as part of the national revival and global development. Recent breakthroughs at MIT in the manufacture of much more powerful, compact superconducting magnets give a hint of what could be possible. Besides the universities, dozens of small companies around the United States and around the world have formed to pursue the goal of making commercial fusion energy devices. Decades of slow progress have now put the world on the cusp of success in this area. The situation is much like the similar situation in 1900

FIGURE 3



Science Museum, London

A model of the Skylon spaceplane, designed by Reaction Engines, Ltd. in the 1990s. It has the SABRE air-breathing rocket engine. The spaceplane takes off like an airplane, reaches low Earth orbit, and lands like an airplane on its return to Earth.

with respect to the development of powered aircraft. We do not know who will be the new Wilbur or Orville Wright, or the new Glenn Curtiss, or Louis Charles Joseph Blériot, but they are out there.

Since successful fusion power or fusion propulsion systems have not been developed yet, Federal grants to legitimate projects of multiple types must be offered on a large scale. Of particular note from the standpoint of NASA, the small grant made to Princeton Satellite Systems for its work on development of the Direct Fusion Drive rocket must be turned into a contract to begin building test engines, and then prototypes.

In 2019, Reaction Engines, Ltd. of England, successfully tested its engine precooler design up to Mach 5 conditions at a Colorado facility, in a trial sponsored by the U.S. Defense Advanced Research Projects Agency (DARPA). This is the key technology required to build Reaction's proposed air-breathing rocket engine, **Figure 3**, the Synergistic Air Breathing Rocket Engine (SABRE). This technology holds the key to building space planes that can take off and land like aircraft, yet fly up to orbit. The ability of a rocket engine to use ambient air up to very high altitude and Mach 5—at which point the rocket can switch over to onboard Oxygen—makes routine human access to LEO possible. While DARPA and Boeing are interested in this technology for aircraft, NASA should sponsor the development of the first actual spaceplane using this technology.

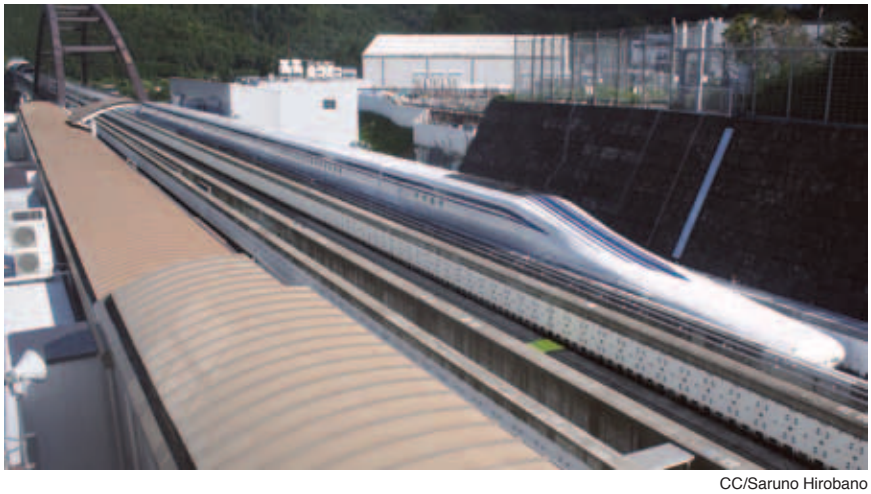
Finally, we again push for the development of the StarTram superconducting maglev evacuated-tube launch system for heavy freight. Proposed by Dr. James Powell, the designer of the world-record-holding Japanese superconducting maglev railroad system, **Figure 4**, now being installed for commercial operation, StarTram is a system that imparts most of the energy to the orbital vehicle while it is on the ground, instead of requiring the vehicle itself to carry along massive quantities of fuel.

The high G forces associated with the first version of this system would make this purely a freight system, but would promise the cheapest freight delivery to LEO from Earth of any known system. Decades ago, Krafft Ehricke had proposed a similar maglev launch system for the Moon (minus the tube, since the Moon has no air resistance). It just so happens that the same general technology is needed to build modern rail systems for travel on Earth.

There is no dichotomy between the technologies needed in space exploration/development, and development of terrestrial civilization. The more Federal grants, contracts and credits are directed into meeting the challenges we have identified here, the bigger will be the payoff in increasing mankind's potential relative population-density, the key economic metric put forward by Lyndon LaRouche.

That is why Presidents Trump, Xi, Putin, and Prime Minister Modi must meet, agree to shut down the floating exchange-rate system bubble economy (the modern

FIGURE 4



CC/Saruno Hirobano

The Central Japan Railway's superconducting maglev line, now being installed for commercial operation.

form of the British Empire), create a New Bretton Woods gold reserve system, and implement the full LaRouche Four Laws program to ensure the future our posterity deserves.

The New Paradigm, on Earth and in Space

When we speak of agreement among the United States, the People's Republic of China, the Russian Federation and the Republic of India, we do not disrespect any other nation. We speak of the four most powerful republics on Earth, the minimum united force capable of overthrowing the City of London/Wall Street-centered imperial disease, which has spread war and poverty for centuries. Each of the four republics has been targeted for destruction by the British Empire. The four have an identical interest in its final demise.

In LaRouche's New Paradigm, relations among sovereign nations will return to Alexander Hamilton's and Henry Carey's concepts of complementarity and harmony. In Hamilton's case, he refuted Adam Smith by insisting that since producers need customers, a farmer should be very happy to have prosperous cities to which to sell, and likewise a tool-maker or bookbinder in the city should be very happy to have prosperous farmers to whom to sell. Your interest is not to rob the producer by manipulating prices. It is in your interest to give the producer the cost of production plus a little more for reinvestment in improvement of tooling and product. The synergistic result far exceeds the potentials when there is no mutually beneficial relationship.

This simple principle, foreign to the fake news organs of empire, must again become the basis of American policy, as it had been under leaders such as John Quincy Adams, Abraham Lincoln, Franklin Roosevelt and John Kennedy.

In the deadly environment of space, mutual dependence is even more intense. The expanse of trillions of galaxies, the relative smallness of the Earth, combined with the huge amount of work required just to preserve life, serve to bring people and nations together in a profound way. Ask any astronaut.

So what will be the role of the United States in the New Paradigm in space? As a nation of nations, mixing people and ideas from all over the world, and with deep connections back into every corner of the world, and an incredible history, the world counts on the United States, and its space agency NASA, to bring nations, companies and people together in the development of space. We expect that individual countries and companies will wish to develop and maintain their own independent spacecraft, launch systems, and lunar mines, but it is very important that all the systems maintain minimal degrees of interoperability and be mutually supporting.

We would expect NASA to continue to put together partnerships with nations and companies, as it is negotiating for the Lunar Gateway. There is so much work to do that some division of labor is mutually beneficial. As previously mentioned, it will be important to bring in China and India to the teamwork.

The World Is Counting on the United States

But of greatest importance, the world is counting upon the United States for revolutionary ideas that solve problems faced in space development. The world is counting upon America to realize Kennedy's vision of an unending stream of technological revolutions with infinite possibilities. The reason that LaRouche PAC and *EIR* speak of the key role to be played by the new 50 million productive jobs to be created inside the United States, even as we speak of creating 1.5 billion new productive jobs worldwide, is that the world is in need of a massive upshift in technologies of production. As LaRouche stressed, the most important factor in determining the relative *labor power* of a group or society is the quality of its tooling and organization. The quality of the tooling is determined by the science and technology that go into the design of the tools.

It is true that widespread distribution and application of existing technologies could raise the general worldwide standard of productivity and living conditions. However, really massive global improvements require breakthroughs in all of the areas of which we spoke earlier, plus areas such as optical biophysics and areas yet to be conceived. Some breakthroughs will come from other countries, but the world is counting upon the U.S. to produce more than its fair share of progress. Because of the past decades of Imperial suppression, we have quite an array of people with ideas and plans, just waiting for the chance to test them.

As we dismantle the monetarist control over the economy and the Imperial control over the means of communication, let us, as a Federal Government, direct the resources, whether contracts, grants or loans, into the space program, the rebuilt fusion program, the national labs, the university labs, and to responsible people with big ideas!—especially those with no possibility of immediate success, because it is such long-term projects successfully brought to fruition that will have the most revolutionary effects. The Universe will pay us back!