# Why and How Humanity Must Return to the Moon

by Kesha Rogers

May 5—Mankind's exploration and colonization of outer space should never be seen as merely a destination or something fun to do on the cheap. Properly understood, the exploration of space is the key driver for all human scientific and economic progress. More than that, the exploration of space and the discoveries that we will make along the way, will truly unleash great creative discoveries and our divine spark of reason that distinguishes mankind from the beasts.

Our space program must again be the driving force for making America great again, as we seek to make bold new discoveries that will not only advance our nation, but will be to the betterment of all mankind. This is why it is imperative that we take a new leap in our commitment to space exploration, in immediately moving to fulfill the intention stated by President Trump to return to the Moon and establish a permanent presence. This will require a renewed national mission to develop the whole of low Earth orbit (LEO) and cis-lunar space, and fully develop and utilize the Moon, establishing a permanent presence and settlement, as a launch pad to other nearby planetary bodies.

This is the precise conception and vision of space colonization laid out by the late space pioneer and visionary Krafft Ehricke, one which has continued to be at the forefront of American statesman and economist Lyndon LaRouche's platform for space colonization. In a report written in 1986 titled, *The Science and Technologies Needed to Colonize Mars*, LaRouche wrote,

> The ordering of the leading practical goals of our nation to be consistent with, and sparked by the Moon-Mars colonization mission assignment, essentially fulfills the practical side of our obligations to prosperity's general welfare.... The Moon-Mars colonization mission illustrates the

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*First ever picture of the Earth rising over the Moon, seen from Apollo 10 as it orbited the Moon.*


EIRNS/Stuart Lewis

*Lyndon LaRouche, speaking at a memorial conference for Krafft Ehricke in Reston, Va. June 15, 1985.*

> point that what the world and our nation will be, 50 years from now, will depend upon what we do, or fail to do, during each of the five decades between now and then.

It has now been thirty-two years since LaRouche wrote this report outlining the needed direction for our space program, to develop a space development platform of the Moon, cis-lunar space, and low Earth orbit, consistent with Ehricke's vision of an "open world system." LaRouche's proposal was written only five years after the first Space Shuttle, *Columbia*, rocketed into space. It was also produced two years after President Ronald Reagan *directed NASA to build an international space station "within a decade," in his January 25, 1984 State of the Union address.* In that address, President Reagan stated,

> A space station will permit quantum leaps in our research in science, communications, and in metals and lifesaving medicines which could be manufactured only in space. We want our friends to help us meet these challenges and share in their benefits. NASA will invite other countries to participate so we can strengthen peace, build prosperity, and expand freedom for all who share our goals.

Where is our space program headed today? Are we making plans for a renewed national mission shaped around a modernized Space Transportation System and permanent presence on the Moon, as an operational base for launches to other nearby planetary bodies? Will NASA take leadership again, as a driver and leader of human progress and scientific discovery? All of these questions will not be answered in this one report, but I want to begin the much needed discussion and debate.

## Input from an Expert

On the anniversary of the first Shuttle flight, the flight of *Columbia*, which launched on April 12, 1981, twenty years after the first human flight into space, I had the opportunity to meet Robert F. Thompson, former Apollo Application Program Manager (later "Skylab"), and former Program Manager for the Space Transportation System (later "Shuttle"), at his home. Now 93 years old, Thompson, a key architect of NASA's post-Apollo manned spaceflight programs, recently wrote a report to President Trump's newly formed National Space Council, titled *Making America's Space Program Great Again*. Thompson joined the NASA Space Task Group in 1958. In our discussion, I was able

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*The launch of space shuttle Columbia on its first mission on April 12, 1981, for an Earth-orbital mission which began a new era in space transportation.*

White House/Paul Williams

*President Donald Trump, receiving a NASA flight jacket on March 21, 2017, after signing the NASA Transition Authorization Act of 2017 at the White House.*

to learn much about Bob Thompson's decades of work in our Nation's manned space program, and to speak with an individual who is determined not to see all of our nation's past accomplishments squandered.

In the overview to his report, Thompson says,

> President Trump can make America's failing manned space program great again. To do so, the incoming administration must acknowledge NASA's disarray and understand how the agency squandered America's leadership in space during the post-Apollo years. NASA and the new commercial space enterprises can successfully lead the exploration and development of Earth-Lunar space and establish a permanent American settlement on the Moon by realigning their efforts along the Space Transportation System (STS) architecture that was devised following Apollo.

Thompson continues in this overview, "The Trump Administration can restore American leadership in manned spaceflight at a price that our country can afford."

Let us look at the history of post-Apollo NASA. A new era in spaceflight began on April 12, 1981, when Space Shuttle *Columbia*, on mission STS-1, soared into orbit from NASA's Kennedy Space Center, on the 20th anniversary of the first human spaceflight, the 1961 flight of Russian cosmonaut Yuri Gagarin in *Vostok 1*. *Columbia* returned to Earth on April 14, 1981, after orbiting the Earth thirty-six times in a fifty-four hour flight, landing on the dry lakebed runway at Edwards Air Force Base in California. Space Shuttle *Columbia* was commanded by astronaut John Young, and piloted by astronaut Robert Crippen. Prior to this 1981 shuttle flight, John Young had been named the chief of the Space Shuttle Branch in the Astronaut Office, in January 1973.

Astronaut Young spoke about the shuttle program in his book, *Forever Young: A Life of Adventure in Air and Space:* "Like most who were already involved in refining the shuttle concept, what I wanted was a two-stage vehicle that was totally reusable." The Shuttle itself, because it would have a cargo bay spacious enough to accommodate large modules and other materials and equipment, would become the vital transportation system that enabled the space station to be built and operated. The fleet of shuttles flew from April 1981 to July 2011.

In his report, *Making America's Space Program Great Again*, Thompson poses many vital questions, gives his assessments on where our space program has

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*John Young, left, and Robert Crippen, the commander and pilot of Columbia on its first mission.*

NASA

*Robert F. Thompson, 1980.*

gone, and speaks about what is needed to restore America's Space Program to greatness. He asks,

> How did the once dominant U.S. manned space program fall so dramatically from leadership? How did NASA spend American taxpayer dollars to build the Shuttle and the Space Station only to later cede operational control and sole access to the ISS to the Russians? Why has NASA repeatedly started, then cancelled multi-billion dollar endeavours including Space Station Freedom, the Single Stage to Orbit Space Plane and Constellation? Today, the United States can no longer launch American astronauts into low earth orbit, to the International Space Station or to destinations beyond, capabilities that now only Russia and China possess. The United States' Space Shuttles, the most advanced and capable space vehicles ever built, have been decommissioned to become museum exhibits.

Thompson relays that Apollo's architecture of disposable space vehicles was totally unsuitable for a sustainable manned space program to explore cis-lunar space, or to eventually return American astronauts to the Moon, on the annual budget levels that NASA was told to expect. Thompson and his post-Apollo human space flight team got to work on evaluating three strategies to develop reusable space vehicles, to establish permanent outposts in cis-lunar space (known as, "parking regions") that were located progressively further from the Earth, and to use these "gravity-free" outposts to create a supply chain and transportation infrastructure for establishing a permanent American settlement on the Moon.

Here, I want to focus in on the section in Thompson's blueprint that he calls the "Key Elements of the Space Transportation System (STS) Architecture." What follows are excerpts taken directly from his report:

## Key Elements of the STS Architecture

**Reusable Space Vehicles:** The airliners that we fly in today are completely re-useable, requiring only refuelling between flights and periodic maintenance. If all—or some—of a space vehicle can be recovered and re-used, then the operational costs of spaceflight can be significantly reduced.

We envisioned that the first element of the STS

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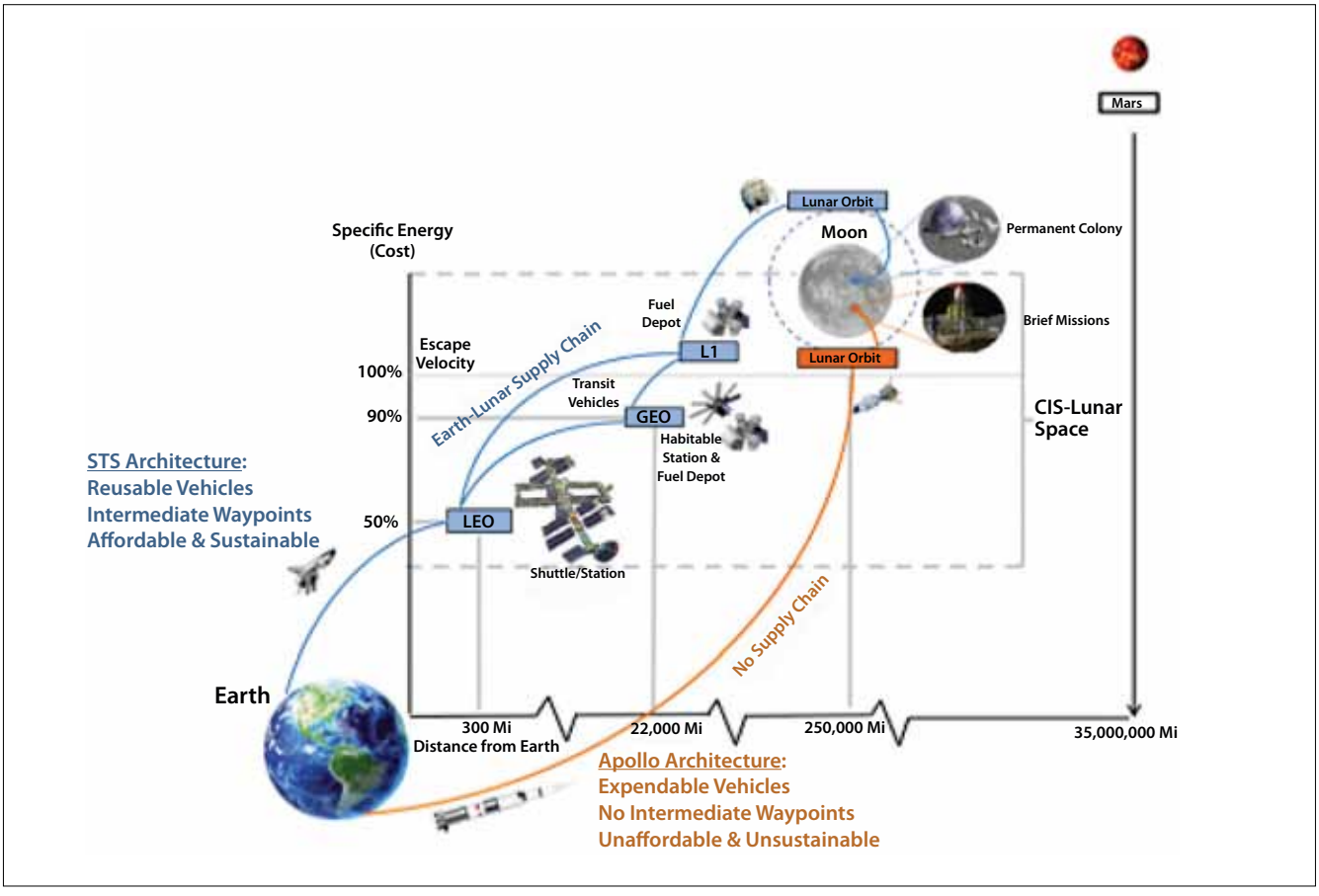
*Shuttle officials Aaron Cohen (center) and Robert Thompson (right), with astronaut John Young (left) during a Shuttle briefing.*




would be a reusable Shuttle to fly astronauts and cargo to and from low Earth orbit. The Shuttle would return through the atmosphere to land on a runway, a method of returning to Earth highly preferable to splashing down in the ocean to await recovery. This method required wings in our opinion. Lifting bodies were marginal.

**Cis-Lunar Outposts, Waypoints & a Supply Chain to the Moon:** There are locations in Cis-Lunar space where a space vehicle can remain in position with little expenditure of energy. These parking regions include low Earth orbit (LEO), geosynchronous Earth orbit (GEO), Lunar orbit and Lagrange or libration points (L1-L4) where gravitational and centripetal forces balance to allow a space vehicle or fuel depot to "hover" in position. These Cis-Lunar waypoints can be used to establish a supply chain and transportation infrastructure between the Earth and Moon.

Once flying, the Shuttle's crew/payload carrying capability would be used to assemble a permanently manned space station in LEO. Placed in a plane close to that of the lunar orbit, the space station could serve as a platform for assembling and launching a new generation of space vehicles to the Moon. We envisioned that future Lunar missions would be launched from the space station using a new generation of refuelable vehicles that were specifically designed for translunar flight, with re-entry through the Earth's atmosphere flown by the Shuttle.

To deliver the translunar vehicles to the space station for travel between the station and GEO, L1 and Lunar orbit, we envisioned a single-use Shuttle-derived cargo vehicle that could launch up to 300,000 pounds to the space station. The Shuttle-C could be cost-effectively developed by using the propulsion systems and launch infrastructure developed for the manned Shuttle.

## A Permanent Moon Settlement

We envisioned that vehicles and fuel depots placed in Cis-Lunar waypoints at LEO, GEO, L1 and Lunar

orbit could be used to create a supply chain and transportation infrastructure necessary to support a permanent American settlement on the Moon. Scientists and mountain climbers employ similar outposts and base camps in the exploration of Antarctica and Mt. Everest.

In contrast to the STS architecture, every Apollo mission was launched from the surface of the Earth to the Moon without establishing intermediate "gravity-free" outposts that could be used by future missions. Compared to the STS architecture, the Apollo mission profile could only support brief manned missions to the Moon and it did not provide NASA with an affordable or sustainable means for exploring Cis-Lunar space or for returning to the Moon on a realistic budget. Open ocean landing should be avoided.

As our planning concluded in the early 1970's, we thought that the new STS architecture would provide the United States with an affordable means for American astronauts to explore, utilize and develop Cis-Lunar Space for many decades in the future, culminating in a permanent American settlement on the Moon with a supply chain that stretched back to the Earth's surface.

In addition to providing a sustainable pathway for manned space exploration, each destination in Cis-Lunar space could be utilized for scientific, commercial and strategic values as shown in Table 1.

**Table 1 – Destinations in Cis-Lunar Space for Utilization and Exploration**

| Cis-Lunar Parking Regions for Waypoints & Outposts | Utilization Value | Exploration Value |
|---|---|---|
| **Low Earth Orbit** | Medical Research<br>Microgravity Research<br>Astronomy | Transit Station from Earth's Surface to LEO and LEO to Further Waypoints |
| **Geosynchronous Orbit** | Communications, Solar Power Generation<br>Earth Science<br>Continuous Earth Surveillance | Transit Station Between LEO and Translunar Destinations<br>Fuel Depots<br>Space Vehicle Parking |
| **Libration Points** | Earth-Lunar Communications<br>Space Radiation Research | Fuel Depots<br>Space Vehicle Parking |
| **Lunar Orbit** | Assembly Station | Transit Station to Lunar Surface |
| **Lunar Surface** | Permanent Manned Settlement, Astronomy | Harness Moon Resources for Oxygen and Fuel |

## The Failure To Carry On with STS

In the section titled, "A Permanent Lunar Settlement," Thompson presents NASA's original plan under an STS architecture, for a permanent Lunar settlement. He describes the plan for STS architecture "to provide the United States with an affordable means for American astronauts to explore, utilize and develop Cis-Lunar Space for many decades in the future, culminating in a permanent American settlement on the Moon with a supply chain that stretched back to the Earth's surface." To the great detriment of the United States—and all of humanity—this plan was never carried out.

Robert Thompson, although long retired, continues to be dedicated to advancing our National Space Program and a return to Space Transportation System architecture: "For those of us who dedicated our careers to advance America's manned spaceflight program, watching the events of the past two decades unfold has been painful. Had NASA stayed with the Space Transportation System architecture, NASA's expenditures would have been more than sufficient to maintain a vigorous, ever developing American human spaceflight program."

## A New Space Transportation System for the New Paradigm

The proposals of Thompson and his description of a Space Transportation System should be very seriously considered as we move to determine America's future in Space. Our commitment to the development of Cis-Lunar space and a permanent presence on the Moon is going to be of vital importance. This will also require the adoption of efficient propulsion systems, and a crash program to finally achieve controlled thermonuclear fusion technologies, a necessity that has been at the forefront of the scientific and physical-economic platform put forward by economist Lyndon LaRouche.

Chris Sloan

*Krafft Ehricke invented the Lunar Slide Lander as an alternative to powered descent to the lunar surface, taking advantage of the Moon's sandy and glassy soil to slow the vehicle. He created a new branch of spaceflight dynamics: harenodynamics, after the Latin word for sandy.*

The development of such a space transportation system, and permanent Lunar settlement, is key to mankind's expansion throughout the Solar system. How will this be accomplished? Not by privatized, commercial space flight and "public-private partnerships" for so-called cheap tourist flights to the Lunar surface and other planetary bodies. The achievement of a permanent Lunar presence is the gateway to the development of a human economy in space. The great space pioneer, Krafft Ehricke, wrote similar concrete proposals for Lunar development. In his *Lunar Industrialization and Settlement* paper, Ehricke develops five stages of lunar development, centered on the increase of what Ehricke calls the "human sector":

> The most important aspect of Lunar development lies in the human sector. It bears repeating that technological progress and environmental expansion are no substitutes for human growth and maturity, but they can help the human reach higher maturity and wisdom.

This conception of human progress must be at the forefront of the understanding of what is needed to make America's space program great again.

Ehricke's five stages of Lunar development consist of the following:

First, we examine the Moon from Earth. Second, we examine the Moon from Lunar orbit, consider the optimal site for an industrial base, and establish automated laboratories and pilot facilities on the surface. Third, we locate the best spot on the Moon for an initial industrial base, and establish it there. Fourth, from this base, we establish a larger industrial zone that can return resources to Earth while expanding across the Moon. And fifth, we expand and diversify from this initial base to create a translunar space-faring civilization.

This is the necessary future for the human species.

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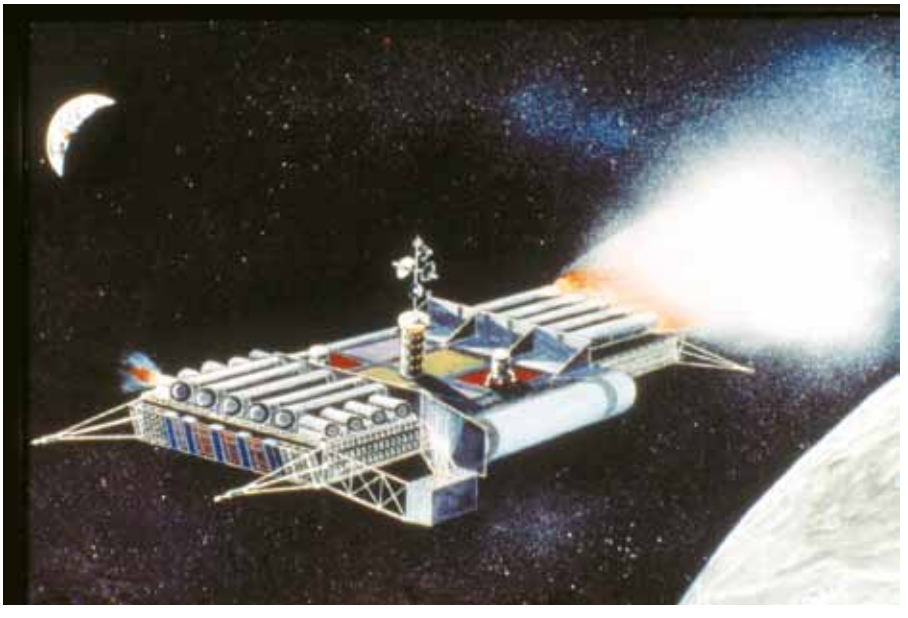

*A nuclear lunar freighter, drawn by Krafft Ehricke.*