From a book in progress

PART ONE

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"Rebooting Spaceport America"

Rocket Ship Tourists and Space Commerce:

Launches in the Desert Regolith of the Borderlands

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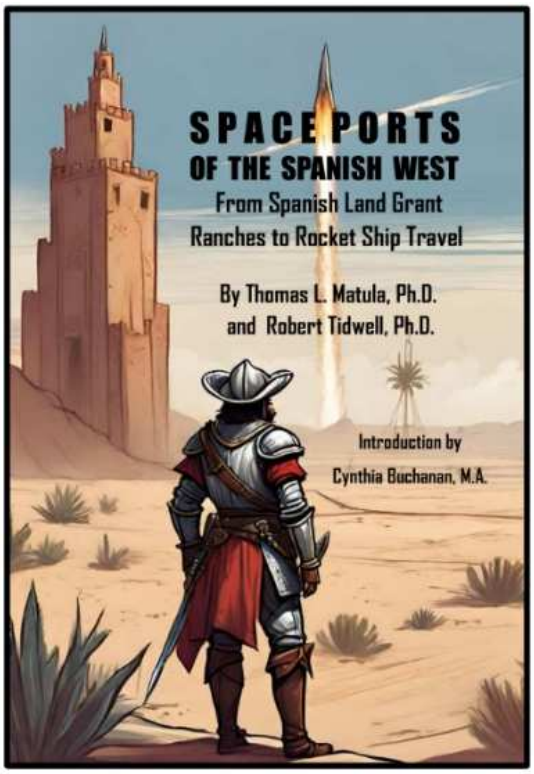
"Politics without history has no root;
history without politics bears no fruit."

(Emil Ludwig, 1942)



In the sprawling Chihuahua Desert system along the international border joining the U.S. to Mexico, the landscape of terrestrial regolith is home to ferocious plant life—the *cholla* jumping cactus growing alongside golden barrel cactus ("mother-in-law's cushion"). Such rigors notwithstanding, ranches were consistently carved out of the desert valleys on both sides of the frontier for the last century and a half. During the Mexican Revolution warring factions rode wildly across the Rio Grande—or Rio Bravo, as the great river is known in Mexico.

In 1915 Texas Rangers clashed with *revolucionarios* on a ranch, chasing them into the geophysics of the High Lonesome Mountains 30 miles from the frontier, vicinity Van Horn, Texas. Princeton alumnus Jeff Bezos bought the Corn Ranch not far off from this desert cowtown and in 2008 built a spaceport on the vast acreage of his ranchlands. Here he launches rockets under his *Blue Origin* banner..."step by step—with ferocity." On July 20, 2021, his New Shepard was boosted into space, Bezos and his brother aboard for the ten-minute suborbital trip. As were passengers who paid rather well for that astral experience. *Blue Origen's* next space shuttle was in October; Bezos' guest was 90-year old William Shatner of "Star Trek" fame, tears in his eyes to see Earth dangling like a lonely blue bauble in the blackness of space.

Here on that blue bauble, I had watched New Shepard's launch, armed with a pair of binoculars. I joined others at a West Texas roadside near a barbed wire fence at ranchlands about 15 miles distant from Jeff Bezos' spread. A cluster of cows approached us as if to say..."What's the deal?"...expecting us to toss alfalfa cubes.

Two months earlier, one sunny New Mexico day 50 miles beyond Las Cruces also located in this Chihuahua Desert that spills over into borderlands Mexico, I parked beside railroad tracks of the *Burlington Northern Santa Fe* to watch a test flight at Spaceport America. This spectacular facility is nestled along the old Camino Real in the Jornada del Muerto basin, desert regolith formed by combustive millennia. That is to say, by cosmic creation and destruction long before Spain ever colonized New Mexico in the 17th century.

Come 2007 the dream of a spaceport was born when New Mexico taxpayers voted to fund the enterprise as their hope for revenue in a depressed region; $220,000,000 in bonds. Economic development. The monumental vision was seeded by a 1991 feasibility study under the aegis of New Mexico State University at Las Cruces. NMSU became, as it were, the creative launch pad for all rocketry that today operates out of Spaceport America.

The air launch of a suborbital spaceplane I watched on May 21, 2021 took the form of SpaceshipTwo developed by British entrepreneur Sir Richard Branson. The lift-off—horizontal "glide-launch"—was with carrier aircraft The White Knight piloted by *Virgin Galactic*'s test crew.

Seventeen years earlier I was fortunate to be in California at XCOR's hangar in the Mojave Desert on June 21, 2004, to witness the launch of SpaceshipOne. It was the first private crewed vehicle to reach the limits of outer space. The success of that spaceflight inspired Branson to contract with Scaled Composites, Inc., to build this larger vehicle SpaceshipTwo for his new firm *Virgin Galactic.* Progress with his iterations of the spaceplane was tragically marred in 2014 when a crash killed a test pilot at the Mojave Desert site.

In 2014 Richard Branson was to become the star tenant at Spaceport America but had been experimenting at the controversial aerospace hub since 2008. The only company more of a spaceport veteran as a tenant was *UP Aerospace* testing unmanned vertical launch rockets. Horses for courses in the new space race. In July 11, 2021, when Branson launched Spaceship Two, Sir Richard was on board with five *Virgin Galatic* confederates.

I watched it fly into the New Mexico azure to cross the boundary into space. To witness a spacecraft actually transporting passengers to a lower region of outer space was a propitious moment for me, a sense of personal fulfillment linked to a 30-year journey that began at New Mexico State University with its comprehensive research and innovation. In that vein NMSU had masterminded that unique feasibility study resulting in "Southwest Regional Spaceport," as it was known in 1991 and I was privileged to have been involved as a graduate student.

Leading the team that directed the study was engineer Bernie McCune, a prime mover at NMSU's Physical Science Laboratory, founded in 1946. McCune's ground-breaking research in aerospace, rocketry, missiles, satellite tracking, and weapon systems that involved national security were but a few of the new technologies that had him traveling, for example, to Spain, among his global destinations. Moreover, in the 1970s McCune was a key figure in the feasibility study to launch an early version of the space shuttle from White Sands Missile Range, a half an hour from Las Cruces.

By the time he led the economic aspects of the 1991 feasibility study for the future Spaceport America, I was a Ph.D. candidate assigned to assist with the study. My appointment was due to the efforts of Dr. Kevin Boberg at NMSU'S College of Business Administration; I was in the inaugural class of the newly created Ph.D. in the Business Administration program and Broberg was a member of my doctoral committee. The chairman was my advisor Dr. Eric Pratt.

The funding to study the economic promise of a spaceport was secured by Dr. Burton Lee at Stanford University, who lectured in their School of Engineering among his array of global roles. Besides his degrees from Stanford and Cornell, he was a 1988 graduate of the first class at International Space University hosted by Massachusetts Institute of Technology.

In 1990 he proposed to NMSU that southern New Mexico serve as a site for the recovery of reentry capsules. He wrote the early strategic plans for the spaceport feasibility study. Years later as chief economist on the New Mexico Spaceport Economic Impact Study he served on a team at New Mexico Economic

Development Department in 2005 and 2006. Subsequently, Burton Lee secured $100,000 in state appropriations for building a spaceport.

By then, he had already advised governments not only in the fields of space, aviation and satellite development but innovation policy, venture finance, corporate development and commercialization. Lee was a consultant to NASA both at Kennedy Space Center and Johnson Space Center. For us at New Mexico State University it was the $1.4 million "seed" monies he raised with Senator Pete Domenici and appropriated through NASA that funded the feasibility study. Burton Lee is thus considered the co-founder of Spaceport America.

From those federal monies I was paid as a graduate assistant in 1991. To complete my Ph.D. in Business Administration I wrote my dissertation on the marketing aspects of commercial spaceports. Since then, I've published numerous academic papers on the role of spaceports as engines of economic development. As mentioned, that feasibility study marked a fortuitous turn of events for me. The concept of a spaceport seemed to...*anoint*...my boyhood dream of multi-planetary travel and rocketry. However, when I was eight-years old building model airplanes in Chicago, then graduating to model rocket ships, my restless imagination never conjured a spaceport in the Great American Desert pock-marked by craters that were cousins to those on the Moon with its regolith, albeit my father's and older brother's telescope opened up the sky and the magic of astronomy put the solar system within reach.

I read *The Martian Way* and every work by Isaac Asimov, Robert Heinlein and Arthur C. Clarke. Buzz Aldrin and many of the astronauts, were, as well, shaped in their youth by this science fiction. Today in space science there must be a whole generation of engineers and physicists smitten as kids by those visionary novels and that imagined world. Unhampered by logic, childhood senses intuitively that "fiction arises out of the shortcomings of history." Even Einstein—that lion of physics—knew imagination is the secret sauce. Elon Musk, a University of Pennsylvania graduate in physics, would no doubt agree with Professor Einstein.

Meanwhile, Jeff Bezos as a youth in Albuquerque was among the devotees of novelist Heinlein. Then one summer in South Texas on his grandfather's cattle ranch Bezos read *The High Frontier: Human Colonies in Space* by Gerard O'Neill. Bezos was therewith prompted to apply to Princeton, where astrophysicist O'Neill was the abiding spirit on the faculty and Bezos graduated in 1986 with a degree in electrical engineering. He is today among the most imaginative of business moguls--an "infinite player." In 2021 when he launched *Blue Origin*'s space shuttle at his West Texas venue Bezos achieved an independent, cowboy-type homeostasis of the sort long identified with American exceptionalism.

Two months earlier in that "space race" year of 2021, Richard Branson's manned spaceplane lifted off in New Mexico at Spaceport America in this same Chihuahua Desert. Commercial spaceports in such topography remind us of Earth's kinship with the planetary system we seek to populate. First we have to get there. It's all feasible. And somebody has to finance it.

That economic dream propelled by NMSU's rugged study only awaited FAA approval for spacefaring applicants. Branson's space shuttle in 2021 marked the 400th commercial space launch FAA had licensed over a span of more than a half century.

The day I watched the launch of a *Virgin Galactic* spaceplane with paid-up "space tourists," though I felt a sense of completion, I also felt a twinge nagging me about that feasibility study 30 years past, that original mission for the future spaceport. Any permutations were meant to invigorate a depressed region and reward New Mexico county taxpayers for their faith. The spaceport mission as configured by NMSU's College of Business Administration was explicit about the future revenue sources.

Fifteen years later New Mexico Spaceport Authority monitored the architectonics supporting that feasibility study. So what happened to the succinct focus of a facility meant to be a location for research and the development of commercial spacecraft? Revenue streams derived from spaceport programs that fostered new industries based on agricultural, robotic energy and construction technologies? Spaceport America whatever its venues was never meant to be a destination for rocket trip tourism. The spaceport was intended as a developmental facility.

It would be no surprise NMSU as a land grant research institution founded in 1888 would wish to hew to its own mission. Federal funds some hundred years later empowered the spaceport study in 1991 and $1.4 million from the U.S. Congress as "seed" monies. Those were not from taxpayers of the Spanish Southwest alone, though southern New Mexico was the bedground for global momentum ever since 1945 when Robert Oppenheimer's theoretical physics took hold at White Sands Proving Grounds with the testing of the atomic bomb. "Little Boy" and "Big Man" were not the only secret program in New Mexico.

At the close of World War Two the U.S. Army in Germany seized Hitler's V-2 rocket or "vengeance weapon" (*vergelgungswasfen)* and the rocket was sent to Fort Bliss in Texas. After months of modification under "Operation Paperclip," a V-2 missile was fired at White Sands Missile Range, the birthplace for all rocketry in the United States since 1945.

White Sands lies directly east of Spaceport America. As a new graduate student in 1989, on my own steam I drove out to U.S. Highway 70, vicinity of the Missile Range just over the mountain. Today when the military tests rockets at the missile range, the highways are shut down, whereas in 1989 I was able from the highway to watch the first launch the FAA ever licensed. A company called Space Services, Incorporated, shot an unmanned suborbital rocket into the stratosphere. The McDonnell-Douglas DC-X test flights at White Sands inspired the vision of a "Southwest Regional Spaceport" as a hub for space technology and development.

Following NMSU's feasibility study, advocates of the spaceport created the "Southwest Regional Spaceport Task Force (SRSTF)." As a member of that Task Force, I helped write the 1996 White Paper establishing the business case for the enterprise but did not include "space tourism" because the team did not see it as a near term market. "Space tourism" did not exist in 1998 beyond the X-Prize and some vague hopes of space advocates. Recreational tourists traveling into Low Earth Orbit was conjecture, if at all. Not until 2021 did Jeff Bezos stage a $28 million auction for seats aboard the New Shepard, wherein winners experienced weightlessness.

As regards SpaceX Starship from Elon Musk, his behemoth of a rocket is larger than NASA's three-stage Saturn V that lifted astronauts to the Moon in 1969. Today the South African space entrepreneur foresees rocket travel as earthly transportation for quick-hop destinations between cities. That said, the Task Force White Paper of 1996 looked at rocket trips for transportation but not suborbital tourism.

Back in 2004 on June 21, Scaled Composites carried out its second successful launch with SpaceshipOne. Following this flight Branson contracted with Scaled Composites to build a follow-on vehicle, SpaceshipTwo for the space entrepreneur to pursue his aim of flying tourists. However, by 2008 when Branson signed the 20-year contract with New Mexico authorities, he urged a name change: "Spaceport America" and, at that point, his company gave new life to the long-term project. "Terrestrial space tourism" was suddenly the economic focus, technology development in a secondary role.

The proposition of revenue based on "terrestrial space tourists" and a Visitors Center had made it possible in 2005 to raise the financing to build the spaceport. Although much smaller than originally envisioned, only

28 square miles instead of 373 square miles, it provided a location for development of space technology in New Mexico but came at the cost of hitching its future to the success of its anchor tenant, *Virgin Galactic.*

By mid-2023, Branson had launched his spaceplane *VSS Unity* carrying his first commercial customers. He allegedly charged $450,000 for each of three passengers, researchers from the Italian Air Force and National Research Council of Italy. By that time watch-dog media more than examined this space hub in New Mexico and its relationship to star tenant *Virgin Galactic.* In 2024 that relationship appears to have come to an impasse though rocket tourism as an impulse still drives Branson.

The most penetrating and prickly inquiries about spaceport revenue come from legislators representing districts that gambled on this "purpose-built," dream to which the website alludes. When New Mexico's finance committees inspect the spaceport's future they struggle with allocations for the "Gateway to Space." In November of 2023 *Virgin Galactic* suspended its spaceflight trips, pending the development of Branson's newest vehicle to fly customers. This hiatus in rocket tourism provides an opportunity for Spaceport America to revert to its original vision as the focal point of New Mexico's burgeoning space industry. Space tourism based on suborbital flights was always a very limited market, which is why it was never included in the original feasibility studies and business plan by Burton Lee.

If you are determined to see a rocket launch you park on the county road by the Santa Fe railroad track about a mile from Spaceport America's gate. The spaceport is closed to outsiders. Thirty miles away at Truth or Consequences, you'll find Spaceport America Visitors Center advertising a tour to learn *"the motivating factors that started 'NewSpace'"*...or *"entrepreneurial space"* as this puzzling notion is referred to in Spaceport America culture. If "entrepreneurial space" is the stated marketing principle, it gives me pause. *Nomen est omen.* "Entrepreneurial space" as commerce indicates that along Spaceport America's labyrinthine pathway to the stars the enterprise got confused as to its original purpose. It blurred the vision. Even considering "terrestrial space tourists"—spectators at launches or who travel to the Visitors Center—when did "space tourism" morph into *travel by rocket ship?* For the moment, the slippery lexicon in the new space age considers astral passengers are either "suborbital space tourists," "private astronauts" or "spaceflight participants," as federal regulators call this demographic. In 2022 *Virgin Galactic* has contracted with Boeing to build the new "Delta" to replace SpaceshipTwo.

Yet the extent to which space entrepreneurs are "pillars of economic development" in southern New Mexico remains mysterious. Spaceport America as a ghostly enterprise still must snag revenue as one of "the pillars of economic development."

Fluctuating space tourism might wish to consider NMSU's feasibility study of 1991 was undertaken with the greatest rigor, all nuances of the future well-imagined. Over the years the growing pains of this space age facility were presented to the public in an endowed forum at NMSU. A 2007 PowerPoint curated by Lou Gomez, Bill Gutman, Burton Lee and Bernie McCune scrutinized the "History of Spaceport America." The science of complex systems suggests those scholars forecast emergent revenue at the macro level. Spaceport America needs rebooting to return to its original mission. "Purpose-built" means the facility has a caveat to operate as an engine for economic development fostering new industries based on agricultural, robotic energy and construction technologies. Research in these industries are critical for space settlement.

Such inquiry aligns the spaceport with its powers mapped out by New Mexico State University's feasibility study. That first step was under the direction of the pioneering Bernie McCune. It was funded by $1.4 million from the U.S. Congress, procured by the redoubtable Burton Lee. The visionary plan of 1991 was meant as a guide if not a diligent mantra to position Spaceport America as a leader in the new Space Age. A Spanish proverb has some advice... *"Leave the tambourine to the one who knows how to play it."*

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Author, playwright, editor and literary consultant, Cynthia Buchanan holds an M.A. in Creative Writing from University of the Americas in Mexico. She was awarded a Fulbright grant in Creative Writing under the U.S. State Department to go to Spain. Her writing has appeared in *The New York Times, Newsweek, Washington Post, Air Power History* and *Cowboys & Indians,* to name but a few publications. Her comic novel *Maiden,* considered a classic of postmodern American Literature, was taught at Harvard, Dartmouth and UCLA and sold to Columbia Pictures. She has been a speaker at the Harvard/Radcliffe Publishing Procedures course and has taught writing at Texas universities. Buchanan has finished three new novels *The Scarlet Spaniard*, *Jarama Valley Red*, and *Cowgirl Polygamy* and has a memoir in progress *Bathing in Flames with Gottlieb and Gaddis* about New York publishing. Buchanan's graphic novel prototype *Aztec Eagles of World War II: Mexico's Heroes, America's Brothers,* taught as curriculum at the Air Force Academy and Naval Academy, is at www.azteceagles.net, www.bit.ly/legionpodcast, www.bit.ly/azteceagles or www.bit.ly/fictionforce, TeachersPayTeachers.com.