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ART AND THE NEW SPACE AGE

‘MY WORK HAS literally brought me to the most beautiful places on Earth, but apparently nothing is as beautiful as the view of the Earth from space. Astronauts who have been lucky enough to have had that experience say it is life changing. I can’t wait to go.’ Thus supermodel Doutzen Kroes announced news of her forthcoming trip to outer space—the latest trend in luxury tourism.¹ So-called NewSpace exploration has burgeoned in recent years, as the enormous fortunes generated from e-commerce and social media, concentrated in the hands of tech billionaires like Jeff Bezos and Elon Musk, have poured into extra-terrestrial ventures. Companies like Bezos’s Blue Origin, Musk’s SpaceX and Yuri Milner’s Breakthrough Starshot have joined Richard Branson’s Virgin Galactic in framing outer space as a zone of touristic exploration and capitalistic exploitation. None of these flights have actually taken place, despite the optimistic timelines. But those who can afford the \$250,000 ticket have been promised the chance to snap that covetable Earthrise selfie and enjoy the experience of extra-terrestrial weightlessness.²

The NewSpacers’ proposals extend beyond extra-planetary tourism to embrace space-based solar power, asteroid mining and the dream of self-sufficient colonies on moons and planets. They represent a new, more thoroughly commercialized version of an alliance forged between space enthusiasts, scientists and ecologists in the 1970s, when entrepreneur and *Whole Earth Catalog* publisher Stewart Brand funded a space-colonization conference with particle physicist Gerard O’Neill, author of *The High Frontier* (1976). For this milieu, the vast resources of space could provide an exhilarating solution to Earth’s problems of energy depletion, over-population and pollution; space stations could provide a Noah’s Ark

for endangered species.³ In the 1990s, as the spur of Cold War competition faded, their second-generation followers—organized in bodies like the Space Frontier Foundation and National Space Society—turned to lobbying for the privatization of the US space infrastructure. They coined the term NewSpace in 2005 as a brand for their agenda. According to the ethnographer David Valentine, the NewSpace community—tech entrepreneurs, venture capitalists, people from NASA and the aerospace industry—gather regularly at space-investment summits and international space-development conferences, where speeches draw on libertarian and American Frontier ideals. The talk is of ‘exit strategies’: for the venture capitalists, the moment they could profitably cash out their investment; for the space enthusiasts, the dream of living off-planet to escape climate change or ‘big government’.⁴

In this, NewSpace rhetoric echoes the fascination with technology as a substitute for social politics present in Buckminster Fuller’s metaphor of a ‘Spaceship Earth’, an important influence on Brand and his friends. Born in Massachusetts in 1895, Fuller was an inventor and designer who worked in the late 1940s at Black Mountain College, alongside émigrés from the Bauhaus, focusing at first on easy-to-assemble ‘dymaxion’ housing units.⁵ Fuller hit gold as a military contractor in the 1950s, when the Pentagon bought into his geodesic-dome design, later scaled up for world’s fair pavilions and Disney World. In the late 1960s he was taken up as a guru by the new counter-culture. His 1969 manifesto, *Operating Manual for Spaceship Earth*, characteristically lauded technology as the solution to political disputes. To the question, ‘How are we going to resolve the impasse of world-opposed politicians and

¹ Hilary Moss, ‘Doutzen Kroes to Travel to Outer Space on First Dutch Commercial Flight’, *Huffington Post*, 13 April 2011.

² Virgin Galactic has continued tests, despite the fatal crash of its *Spaceship Enterprise* in 2014. More than 700 would-be astronauts have signed up for tickets at \$250,000 each for a two-and-a-half-hour flight. Michael Scheetz, ‘Virgin Galactic nearing first passenger space flights after reaching twice the speed of sound in test’, CNBC, 26 July 2018.

³ Peder Anker, ‘The Ecological Colonization of Space’, *Environmental History*, vol. 10, no. 2, 2005.

⁴ David Valentine, ‘Exit Strategy: Profit, Cosmology and the Future of Humans in Space’, *Anthropological Quarterly*, vol. 85, no. 4, Fall 2012.

⁵ See Díaz, *The Experimenters: Chance and Design at Black Mountain College*, Chicago 2015. ‘Dymaxion’—a neologism of ‘dynamic’, ‘maximum’ and ‘tension’—was coined in 1929 by a Chicago department-store ad exec.

ideological dogmas?', Fuller replied: 'I answer, it will be resolved by the computer. While no politician or political system can ever afford to yield understandably and enthusiastically to their adversaries and opposers, all politicians can and will yield enthusiastically to the computers.'⁶

Like Fuller, NewSpacers tend to view technology as independent from human agency, endowed with an almost mystical quality of political neutrality. To them the fragile nature of the human stewardship of Earth's ecosystem demands the creation of artificial other-worlds to inhabit. Their proposals include colonizing space in capsule structures and protected cabin ecologies, familiar from the bunker logic of military architecture, which would require the human body to remain forever dependent on astro-engineering.⁷ NewSpacers were given a huge boost in 2010 by the Obama administration's shift toward funding private suppliers to fulfill transport missions for NASA and to service the International Space Station.⁸ Outer space has become a *de facto* privatized zone, with immense personal wealth now benefiting from the once-public nature of national space programmes. The scope of these billionaires' projects raises critical questions about the motivation of NewSpacers' drive to exceed the envelope of Earth's atmosphere—clothed as it is in a language of 'freedom' with specific political, economic and racial subtexts—but also about the legacy of the Cold War space race and the current inducements to space exploration.

Image worlds

These questions are also being addressed in contemporary art. Indeed, as NewSpacers embrace Fuller's notion that 'we are all astronauts', visual art today does a lot of the heavy lifting when it comes to issues about rights to space. As Felicity Scott has pointed out, this may be because notions of life in outer space are often constructed in the domain of the image, and aesthetic interventions can make visible 'the political underpinnings through which architecture and the media operate, to render the apparatus more legible, constructed and hence more easily subject to

⁶ R. Buckminster Fuller, *Operating Manual for Spaceship Earth*, Carbondale, IL 1969, pp. 137–8.

⁷ Anker, 'The Ecological Colonization of Space'.

⁸ The Obama administration's 2011 budget for NASA announced 'significant' funding for NewSpace industries, following the recommendations of the Augustine Commission (chaired by an ex-CEO of Lockheed Martin). See Valentine, 'Exit Strategy', p. 1046.

critique.⁹ Artists working on access to space are at the front line of a critical investigation about the contours of the future, both in its material form and social organization, recognizing that much of the surplus capital accumulated from the internet and tech boom is now being funneled into NewSpace projects. Where robber barons once invested in public libraries and universities, the new oligarchs are investing their fortunes in apocalyptic survivalist schemes.¹⁰ Artists are opening up these doomsday projects to greater visibility.

The power of space exploration to organize earthbound desires is evidenced by the wide array of artists who address the topic. Artists such as Jane and Louise Wilson, Connie Samaras and Matthew Day Jackson employ film, photography and sculpture to explore the sites on Earth where older space programmes once thrived and document new zones where private, corporate or otherwise inaccessible space ventures are located. Other artists such as Tom Sachs and Tavares Strachan produce work prototyping conjectural objects and architectures for space travel and exploration. While critical of Fuller's technocratic ideology, they are nonetheless drawn to his emphasis on ad hoc architectural process. Visual artists are also critically investigating the harsh material reality of space. Artists like Rachel Rose and MPA question the managed existence and scientific supervision of astronaut life and the physiological and psychological pressures that off-planet existence might hold for humans. They also flag the astonishing work of repression involved in pretending that a technologically governed capsule existence can surpass the plentitude of ecologies on Earth, or that space travel will foster freedoms, both bodily and political, when it will above all be determined by scientific instruments applied with capitalist means.¹¹

⁹ Felicity Scott, 'Earthlike,' *Grey Room* 65, Fall 2016, p. 23. For a discussion of space colonization arguments in the 1960s and 1970s, see also the chapter 'Passages and Passengers' in her book *Outlaw Territories: Environments of Insecurity/Architectures of Counterinsurgency*, New York 2016, pp. 431–42. The topic of outer space is too often neglected in contemporary art criticism, perceived as a 'goofy' theme or disparaged as escapist science fiction: Benjamin Genocchio, 'Space Adventures, Real and Imagined', *New York Times*, 9 August 2008.

¹⁰ See for example Evan Osnos, 'Doomsday Prep for the Super-Rich,' *New Yorker*, 30 January 2017.

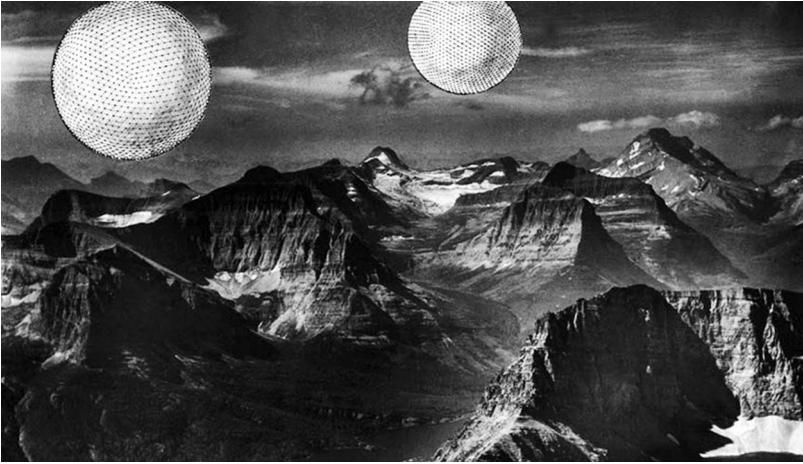
¹¹ See Eva Díaz, 'We Are All Aliens,' in *e-flux journal* 91, May 2018, which focuses on issues of race, gender and ecological injustice by considering works by Halil Altindere, Pawel Althamer, Frances Bodomo, Cristina de Middel, Tomás Saraceno, Larissa Sansour and Apichatpong Weerasethakul.

The metaphor of Fuller's 'Spaceship Earth' as a hybrid ecological-architectural object is not lost on artists working to produce experimental structures and scenarios in art galleries, public installations and film. Some have undertaken projects that emphasize instead the spaceship as a 'poor' architecture, an alternative shelter from which to reflect on histories of inequality and deprivation, or on the role of the colonist or astronaut in modeling ideal citizenship.¹² Fuller was nothing if not a great showman, adept at promoting a vision of life beyond Earth—a utopia in which computers would supplant brainpower in specialized tasks, allowing humanity to turn to the higher forms of thought within the larger matrix of the universe. In his 1960 *Cloud Nine* plan, a collaboration with his former student and later architectural partner, Shoji Sadao, Fuller proposed that large, fully spherical geodesic habitations be heated so as to float above the Earth or other planets, thereby untethering human life from terrestrial existence [opposite]. Gathering works that vector out from Fuller's project, I hope to show how artists have opened up those visions of DIY space travel to wider communities than he anticipated, questioning Fuller's 'we are all astronauts' rhetoric, and taking issue with his ecology-as-technology model of 'Spaceship Earth'.

Homeric age

Only in the last sixty years have humans penetrated the Earth's exosphere, visiting and planting technologies in locations beyond our planet's gravitational field, and returning with material evidence from outer space. The Cold War programmes of extra-terrestrial exploration, from the Soviet Sputnik in 1957, to the US moon landing in 1969, spawned a cultural fascination with outer space. Robert Rauschenberg's 1969 lithograph series, *Stoned Moon*, followed an invitation by NASA to witness the launch of the Apollo 11 at Cape Canaveral in Florida. Rauschenberg's prints feature silkscreened photographs of the intricate technical apparatuses of the space capsule, booster rockets and launch towers, interspersed with vivid images of palm trees, crates of oranges, white herons, beaches and marshes. The lushness of the landscape overwhelms the diminutive astronauts encapsulated in their technologically complex vehicles; Rauschenberg's images balance the verdant abundance of the Floridian swamps with the metallic asperity of technology.

¹² See William Bryant, 'The Re-Vision of Planet Earth: Space Flight and Environmentalism in Postmodern America', *American Studies*, vol. 36, no. 2, Fall 1995, pp. 43–63.



Buckminster Fuller and Shoji Sadao project for 'Floating Cloud Structures (Cloud Nine)', circa 1960; mixed-media collage, mounted on board; courtesy the Estate of R. Buckminster Fuller

Yet the swift decline of Cold War 'man in space' programmes is hardly a heroic story. The US Apollo missions to the moon ended in 1972, and the 1986 Challenger accident, which killed seven astronauts, put a damper on space-travel euphoria. The expensive goals of maintaining a physical presence off-planet were reconsidered after US victory in the Cold War, when the narrative of an East-West 'space race' lost its rationale. The capstone of the USSR's space programme, the Mir space station, was decommissioned by joint US-Russian decision in 1999. It plummeted to Earth as a fireball over the South Pacific. Military and commercial projects focused instead on orbital hardware—satellites for 'electronic intelligence', missile detection, surveillance, navigation, radar reconnaissance, communications, weather.¹³ Currently the only long-duration, 'manned' operation is the International Space Station, run by the US and Russia. Designed for only six astronauts, it is a far cry from the vision of space colonies teeming with settlers propagated by enthusiasts. 'Inner space is useful. Outer space is history', proclaimed the *Economist*, when

¹³ The US has over 800 satellites orbiting the planet, nearly half of them military or governmental in origin; China has 204 satellites, Russia 142. See the Union of Concerned Scientists' Satellite Database, which lists over 1,800 operational satellites currently in orbit around Earth, together with more than 500,000 pieces of space junk—decommissioned satellites and other debris—currently whizzing round the Earth at speeds of up to 17,500 mph.

NASA decommissioned *Atlantis*, the last US space shuttle capable of sending humans into Earth orbit, and the Obama administration moved to privatize the International Space Station contract.¹⁴

This is a striking shift, given the cultural, military and financial resources expended in the heyday of space exploration. From the UK, Jane and Louise Wilson's video installations *Star City* (1999) and *Proton, Unity, Energy, Blizzard* (2000) document the whiplash decline of national space programmes, using the fate of the USSR as a case study. Pioneers in producing immersive projection environments, the Wilson sisters' films each employ four channels projected on massive screens, surrounding the viewers; the films were originally shown as a pair. *Proton, Unity, Energy, Blizzard* was shot at the decaying Baikonur Cosmodrome, where Yuri Gagarin was launched into space, while *Star City* depicts the Gagarin Cosmonaut Training Centre outside Moscow, which by 1999 was in a state of near dereliction. The grandeur of the 30-year long Soviet space programme, and its rapid deterioration after the break-up of the USSR, is mournfully evident in the Wilsons' footage of the gold brocade curtains, now dingy, decorating astronauts' changing rooms, and in the scale of the Gagarin Centre's still-functioning weightless-training apparatuses, spinning to absent audiences in abandoned facilities like so many unpopular carnival rides. Most haunting are the Wilsons' shots of limp, empty spacesuits laid out like corpses in horizontal bunks, or hanging from hooks like lonely containers waiting to be filled—an apt metaphor for the withering away of interest in outer space in the 1990s.

The Wilson films mark a sombre transition. From a distance of eighteen years, their work in exploring shifting agendas for outer space shows eerie prescience. When the films appeared in 2000, the dereliction of the sites seemed attributable to the specific circumstances of the ruined post-Communist state.¹⁵ The more general diminution of Fuller-style space euphoria is a thread in Matthew Day Jackson's works. The American artist at times refers to Fuller's inventions in his sculptures, for example the skeletal *Dymaxion Biotrons* (2009), which are constructed using

¹⁴ 'The end of the Space Age', *Economist*, 30 June 2011. The cover features a miniscule space shuttle silhouetted against a looming Earthrise.

¹⁵ On the reception of Fuller's work in Russia see Beatriz Colomina, 'Enclosed by Images: The Eameses' Multimedia Architecture,' *Grey Room* 2, Winter 2001, which discusses the 1959 Moscow dome Fuller created in collaboration with Charles and Ray Eames.

an armature of metal rods, citing Fuller's energetic-geometry models of the 1940s. In Jackson's *The Tomb* (2010), the once-triumphant figure of the astronaut becomes part of a haunting cortège of death. In Jackson's monumental sculpture, eight larger-than-life astronauts constructed from blocks of found wood act as pallbearers for a neon-illuminated glass coffin. The domed visors of the standing forms anonymize them, turning the figures into mask-like ciphers, while the skull and torso of the 'corpse' is surrounded by a lattice of interconnected metal struts, like a geodesic dome turned cyborgian. The skeleton depicted in *The Tomb* has a Charles and Ray Eames molded-plywood leg splint serving as one of its lower limbs, making the elegy for modernism even more obvious.

Desert spaceports

'Manned' space-exploration projects were once the insignia of the world's most powerful states. No longer. The fates of Star City and Baikonur, documented by the Wilson sisters, have their parallel in the privatized hangars and launch pads of Cape Canaveral.¹⁶ Tech billionaires' companies have snapped up cut-price leases on the surplus infrastructure of the US space programme. These new-tech oligarchs have engaged in a renewed space race of sorts, with Musk's SpaceX recently outbidding Bezos's Blue Origin for a prime Cape Canaveral launch pad. Branson, who made his billions with Virgin Records and Virgin Atlantic air travel, has funneled some of his media and transportation fortune into a space-tourism company, Virgin Galactic. SpaceX and Blue Origin are also planning tourist flights to near space, as well as advertising voyages to the Moon and Mars for indeterminate future dates.

The consolidation of immense riches in the hands of these few men, in part due to reduced corporate taxes and the ascendancy of under-regulated tech monopolies, has provided them powerful leverage to push for state tax breaks and so-called public-private partnerships, benefiting business interests far more than the taxpayers who fund them. In a notorious case, Branson convinced the state government of New Mexico to fund the \$212 million Spaceport America, on 18,000

¹⁶ Unmanned USAF space craft, including the 2018 Solar Probe and those of Saturn (2004) and Mercury (2011), are still launched from Cape Canaveral. US satellite launches now take place mainly from the Vandenberg Air Force Base in California, the Kodiak Base in Alaska or, for geo-stationary satellites, from the international base in French Guiana.

acres of state-donated land, for which he paid a mere \$1 million annual lease; SpaceX is also a tenant. In 2011, Los Angeles-based artist Connie Samaras gained access to the remote and restricted construction area of this boondoggle, currently running a \$500,000 annual deficit footed by New Mexico taxpayers, for her photographic series *Spaceport America*. Shooting on film, and printed at 30 x 40 inch scale, Samaras's photographs emphasize the vast scale of the desert location, which dwarfs the half-dozen buildings under construction.

The spaceport is situated 90 miles north of El Paso, Texas. Approached down a long, runway-like highway, the curved, ground-hugging silhouettes of the Foster + Associates structures conjure Paolo Soleri's Arcosanti in southern Arizona, or the scattering of geodesic domes in Southwestern communes like Libre, Red Rocks or Drop City. This resemblance to Fuller-inspired architecture is no coincidence: Norman Foster was a collaborator of Fuller's in the early 1970s. At the conclusion of the approach road, a low-lying, earth-covered terminal rises like a ramp out of the desert. Its insect-like profile resembles butterfly wings, with a roof bifurcated by a small glass entrance. The narrow spine of the edifice opens to a glass-walled hanger at its rear. Other structures, such as a domed Air Fire Rescue Facility and a Mission Control tower, dot the spaceport complex. Though Samaras photographed the site while it was under construction, there are no people depicted in the images. That was a prescient decision, it seems, as absence remains the defining feature of a site that is now a virtual ghost town after it was opened to the 'public'. At the time of writing, there are no launch dates calendared for the site.

In one of Samaras's images, shot from inside the half-built Fire Rescue dome, the architectural scale is finally revealed [opposite]. Here Samaras depicts the concrete shell of the dome, while the enormous parabolic window of the structure is seen opening up to a vivid blue sky. Soil from the construction site is piled at the foreground of the image, while mounds of dirt in the middle of the image visually echo the distant foothills. The alien quality of the flat landscape is emphasized by the deserted earth-moving equipment in the fore and middle grounds, mimetically relating the site to other construction projects planned in barren, inhospitable spaces like Mars. In contrast to Rauschenberg's swamp pictures, Samaras's images portray the scrub desert of New Mexico as an already depleted wasteland. Not only is it expensive to propel things and people out of the Earth's atmosphere, it exacts a huge ecological cost, one implied by the desolate barrenness of the Spaceport America site.



Connie Samaras, 'View from Air Fire Rescue Facility', 2010, from *Spaceport America*; courtesy Armory Center for the Arts, Pasadena, CA.

For all its lofty ambitions, Spaceport America has the look of a regional airport, albeit with a sleeker design. And unlike other Southwestern utopian-architectural housing schemes, such as Drop City or Arcosanti, the spaceport will be a temporary transport hub for jetsetters-cum-space tourists, people who have the resources to travel by private means to a remote launch pad, spending more than five times the median American annual wage for a brief experience of weightlessness in sub-orbital flight. In documenting signs of construction but no human labour, Samaras suggests a relation between this depopulation and the vision of space travel conceived to serve a wealthy elite. Samaras images the scale of the publicly financed investment, and its complete separation from any kind of social activity or civic society. While an airport is a kind of geographically liminal no-place of mass transit between populated places, the spaceport's isolation and the expense of its proposed flights assumes a strictly limited clientele that will jet in and out. Though ostensibly a commercial location, paid for with public money, the topography of seclusion required to insulate the sound and air pollution of a space base, coupled with the immense cost of rocket travel, makes the spaceport an inaccessible spot for most.

While the state of New Mexico is paying out hundreds of millions for Spaceport America, the NewSpace companies, with no hint of irony, pride themselves on their private-sector approach. Similarly, visualizations of outer space in art and media are being reoriented in ways directed by the rhetoric of private capital and individualism. Artist Tom Sachs, based in New York City, describes the workings of NASA as ‘spirit-crushing’ and ‘bureaucratic’ in his ongoing project, *The Space Program* (2006–present), and instead brazenly champions private development as the more limber approach.¹⁷ In his ersatz space programme, Sachs plasters the NASA and Jet Propulsion Lab (JPL) logos on all manner of objects, lending the project the look of a state-institutional venture. Yet most of the handmade or hand-adapted objects in *The Space Program* are intentionally wonky and non-functional. A modified 1972 Winnebago RV becomes a ‘Mobile Quarantine Unit’, while an adapted golf cart is a lunar rover. A *flambé* cake stands in for a space capsule’s Earth re-entry, while simple graphics of a rocket lift-off sequence involve the use of transparencies on an overhead projector, with an Exact-o knife to chop off the rocket boosters. Slapping the NASA logo on a band-saw that’s been painted white gives it a space-tech look. In a parody of the way that NewSpacers claim to be independent of the state while they take tax breaks and buy up public-funded infrastructure dirt cheap, Sachs appropriates the US government’s NASA or JPL ‘brand’ to lend his mimetic riffs on space equipment and launch procedures the appearance of authenticity.

Administered life

Sachs’s ‘private’ venture, leaning on government support, points to a contradiction at the root of NewSpace ideas. On the one hand, NewSpacers push for a libertarian deregulation of outer space, as a zone for untrammelled profits; on the other, they are heavily reliant on government-built infrastructure and NASA contracts. In part, NewSpacers are motivated to leave Earth because of perceived governmental interference, inhibiting the freedom of individuals, while simultaneously anticipating a future of environmental degradation and the exhaustion of the Earth’s resources. Yet they consistently underplay the intense human interdependency of

¹⁷ ‘What I’ve learned from NASA is stay out of headquarters, don’t ask permission from government, do it yourself, because they will only mire you in bureaucracy, they will crush your spirit. Don’t get a motorcycle license . . . ride safe, but don’t get involved in the system.’ Tom Sachs speaking in ‘Spaced Out: Making Mars with Tom Sachs’, *Vice.com*, 13 June 2012, quote at 6:55 in video.

capsule life, which necessitates social collaboration and regimentation. The hardships of life off-planet are ignored in the naïve *tabula rasa* society-building rhetoric of NewSpace companies, but traveling through outer space requires the complete regulation of the body by scientific apparatuses. It is extremely taxing on human anatomy. Studies conducted on the International Space Station reveal that bone mass deteriorates quickly without gravity, as muscles atrophy. Astronauts in long-term orbit are susceptible to cancer at higher rates due to the intense radiation beyond the Earth's atmosphere, heightened during unpredictable solar flares. Astronauts are required to exercise vigorously at least two hours a day, and the environment of the spaceship is susceptible to moulds and bacteria harmful to human microbiology. Capsule life is psychologically stressful, the inhabitants under constant surveillance.

These constraints indicate the limits on human agency in Fuller's sense of design as an evolutionary cybernetic process. The astronaut becomes the fully administered body, monitored and restricted by technologies created and managed on Earth that are themselves designed by adaptive computer programmes. This cyborg-like technological dependence of space travelers was noted by the Mexican artist Rufino Tamayo, after the 1969 moon landing:

Man is dehumanized in such a way that he has become a robot controlled by the computers that he himself invented . . . I think of men who go to the moon and who are handled from the ground by electronic computers, and I feel they do not have their own will or initiative . . . they acquire certain characteristics that are not very human.¹⁸

For his project *The Orthostatic Tolerance* (2006–10), the Bahamian artist Tavares Strachan researched the ways spaceflight affects the body, undergoing months of astronaut training at the Gagarin Centre in Star City. 'Orthostatic' means standing upright, and 'tolerance' here measures the ability to maintain consciousness during changes in posture. Due to pressure changes and increased velocity, astronauts and deep-sea divers are susceptible to dizziness and the inability to stand upright after return to the Earth's surface. In journeying to a site of astronaut training, Strachan's work probes the strenuousness of the profession, and queries why we would want to adopt a task of incessant self-monitoring as a labour of everyday survival.

¹⁸ Sarah J Montross, 'Cosmic Orbits', in Montross, ed., *Past Futures: Science Fiction, Space Travel and Postwar Art of the Americas*, Cambridge, MA 2015, p. 22.

During the course of the project, Strachan established the Bahamas Aerospace and Sea Exploration Center (BASEC), the artist's version of NASA, in his native country. Working with this pseudo-governmental organization, Strachan deployed several rockets made from Bahamian natural resources—glass from beach sand, fuel from sugar-cane. Launching them up to 20 miles into the Earth's stratosphere, he then collected and displayed the fallen, scorched remnants as sculptural relics. One iteration of Strachan's project is subtitled 'It might not be such a bad idea if I never went home', referring to the ill effects astronauts experience upon Earth re-entry, and he discusses the project's concern with 'the discomfort of going back'.¹⁹ This sentiment makes subsequent works by Strachan about welcome and belonging even more pointed. In one gallery-based work, a sculpture in neon proclaims 'I belong here'; in a follow-up project, a monumental neon sculpture declaring 'You belong here' was tugged by barge around the Mississippi River in New Orleans. The comforts of 'home'—life on Earth—makes these invitations to feel comfortable more poignant, especially in locations like New Orleans where climate change, environmental degradation and real-estate expropriation have displaced so many.

Rachel Rose's work also takes up the unique complexities of astronauts' lives in long-term capsule habitats, and the often painful transition of returning to Earth. Her eleven-and-a-half-minute film *Everything and More* (2015), combines footage shot at zero-gravity facilities with a telephone conversation with David Wolf, a seasoned NASA astronaut who completed seven spacewalks during his time on the Mir space station. As swirling footage of colourful watery oils and bubbles dance on the screen, Wolf recounts his difficult reacclimatization to Earth. 'When I first came back to Earth after 128 days in space, I thought I'd ruined my life. Gravity felt so heavy. The weight of your body is just overwhelming.' In other portions of the film, his voice is accompanied with shots of empty spacesuits, which Rose subjects to a kind of pixilated fragmentation that spreads across the image like a computer glitch. Objects are constantly subdividing and recomposing, only to break down into the glittery viscous oil that seems Milky Way-galactic in its brilliance.

As Wolf describes being '250 miles up', a gospel choir singing *Amazing Grace*, led by Aretha Franklin, starts to drown out his story, echoing in

¹⁹ Franklin Sirmans, 'Tavares Strachan: The Orthostatic Tolerance', *Grand Arts*, brochure published concurrent with the exhibition, 5 February–3 April 2010, Kansas City, MO.

an eerily disembodied and repetitive manner, while the liquid visuals move between states of disintegration and coherence, reassembling as an image of the limpid blue water in an indoor neutral-buoyancy lab pool, where astronauts train for zero-g conditions. As the camera pulls down towards the bottom of the pool, bubbles drift up and the overhead florescent lights appear like equipment silhouetted against the vacuum of space. While the astronaut describes adapting to the ‘incredible darkness of space’, and recalls the immense disorientation of life in orbit, with its outdoor-temperature variations of hundreds of degrees and fast-fluctuating light conditions, Rose intersperses his words with shots of dancers bathed in a lightshow at an EDM concert, an Earth-bound experience of disorientation and sensory overstimulation that uses technology to engineer sublimity.

Capsule crazy

Maintaining sanity in the scientifically governed pod remains a key struggle in space voyages.²⁰ Madness prowls the corners of the claustrophobic conditions, and inflexible routines strangle passions. In early 2017 the performance artist MPA, based in Joshua Tree, California, along with colleagues Amapola Prada and Elizabeth Marcus-Sonenberg, completed a marathon ten-day residency at the Whitney Museum titled *Orbit*. For that period, the three women lived sequestered in a 36-foot-long, 3-foot-wide sliver of the Museum’s theatre, facing the Hudson River. They resided like zoological specimens in this glass-enclosed box, isolated from, yet completely exposed to, the public during museum open hours. Dressed in red outfits that accessorized the vermilion infrastructure of their capsule, they lived on supplies sheltered with them, while recycling their grey water and bottling their urine for the length of their seclusion.

Orbit was meant to emulate, in metaphoric fashion, conditions that might occur on future human-occupied colonies in space or on Mars. On the final evening of the project, the artists, in front of an audience of about 150 spectators, premiered *Assembly*, an hour-and-a-half-long event that culminated their mission. As audience members entered the theatre and took their seats, facing each other across a central runway, the three women were seen lying on a platform in their crimson cage. They began

²⁰ Likewise Connie Samaras’s *Valis*, 2005–07, a photographic project shot in Antarctic science stations, emphasizes the loneliness and mind-numbing boredom of the pod.

slowly massaging one another to recorded audio of orgasmic moans, rhythmically swaying under intense red light. When the house lights came up, the women initiated an efficient bucket brigade, moving their waste products in five-gallon jugs and pails along the narrow corridor of their capsule to an 'off-stage' storage area located behind the door of the cabin. The trio then emerged through a door onto the audience's side of the glass, thus ending their period in 'orbit', moving with trance-like steps down the runway to the back of the room. MPA, a tall blonde woman in her thirties, addressed the audience from the rear of the theater, intoning a few disconnected words about space, the future and Mars, her speech at times interrupted by body contortions and grunt-like vocalizations, signaling that all was not right in her reintegration process.

Reconvening at a front stage hastily set up for a panel discussion, the women seated themselves on stools before the site of their former detention. MPA threw on a dress, literally—a red-sequined, floor-length gown, still on its hanger, hung around her neck. Jay Sanders, curator of the show, began to emcee questions from selected members of the audience, such as artists Martha Wilson, Malik Gaines and A.L. Steiner. The Orbiters spoke of their isolation during the ten-day experience, the boredom of fasting from electronic media, the exhibitionism of the project, the pitfalls of collective living, while providing explicit details about their waste-management protocols. Yet when questions were solicited from the wider audience the Q&A began to get bizarre, with audio distortions affecting MPA's answers. As the other two women stood up to leave the panel, she began writhing atop the chair with her dress hiked up around her. She stumbled away, then the three women returned, calmly hauling all the urine jars and waste buckets on stage, forming an orderly and quite substantial stack of refuse.

Then all hell broke loose, as the audio track of sex sounds began again and the women began humping the wall, gyrating, groaning, writhing and shaking. Eventually, finding herself in the centre of the audience, for several minutes Prada channeled what seemed to be the excruciating pain of childbirth. The sights and sounds of three women performing sex to the point of demented pain for ten minutes was agonizing to witness. Indeed, the audience sat in stunned silence for a minute after the 'climax' as the three women silently filed out of the theatre and the house lights brightened. The exhibitionism of their ten-day fishbowl existence, a performance of the totally administered life of the astronaut who is

scrutinized and monitored while completely dependent on pre-planned resources, had erupted in an id-like expression of sexual longing, self-harm, violence, hysteria and madness.

MPA's *Orbit* calls to mind Philip K. Dick's novel, *The Three Stigmata of Palmer Eldritch*. The story focuses on a desultory group of Earth exiles, stuck in a godforsaken Red Planet colony. Due to ecological disasters, few can afford to survive on Earth and many without resources are 'drafted' to inhabit off-planet sites as a form of population control. Isolated in their geodesic domes, unable to leave the compound other than to pick up supplies on the planet's inhospitable surface, the colonists develop a dependency on the psychotropic drug, CAN-D. They drop it together to escape the monotony of their grim frontier life, collectively hallucinating that they control a Barbie-like doll named Perky Pat. The Pat dolls are the focus of an elaborate shopping addiction, with psychic advertising executives on Earth competing to predict what clothes, home decor and cars the colonists will want to buy for Perky Pat as she goes about her affluent-Californian daily life. Because the colonists have to inhabit Pat's consciousness as a group, they spend most of their time bickering about whether to go to the beach, or go to bed with Walt, Pat's boyfriend. While *Three Stigmata* and *Orbit* belabor the banal routines of colonists' daily life, in *Assembly* MPA and company desublimates the constraints on body and mind inflicted by the isolation of the space capsule. For Dick and MPA, drudgery begets overindulgence; by prying into the unpleasantness of both they make persuasive cases for staying well clear of outer space.

Reclaiming space?

Was the civic dream of space exploration and colonization merely a byproduct of the Cold War, an endeavour to dominate the skies as a strategic military space? Is it now defunct? For NewSpacers, of course, there is no questioning the stakes of space exploration. Acceptance of the inevitability of poverty and inequality on Earth, coupled with the vast expense of astronomical technologies, encourages a logic of competitive survival in NewSpace rhetoric. Access to outer space becomes another scarce resource unequally distributed. Creating a demand for lifeboats to flee Earth, rather than investing in an egalitarian quality of life for all, becomes the ultimate luxury on which to spend the surplus value generated in exploiting class division. Peaceful cohabitation with the realm

of outer space is not on the table. Instead: expanding, investigating, exploring, probing, pioneering, homesteading, mining—in other words, dominating the ‘virgin’ territory of space when the Earth is exhausted as a resource. This domination is undertaken in the name of necessity, by very wealthy people who have very few needs—but many fears.

Capitalism harnesses a fundamental frustration in each subject—a subject constituted in the psychoanalytic sense through a lack of mastery, with respect to our social and physical environment—and channels those dissatisfactions into an incessant expropriation from nature: destabilizing overconsumption on the part of the privileged; scarcity for others. Permanent precarity subverts a non-exploitative relationship to our planet, as the impatient demand to extract everything of value from nature for short-term profit trumps long-term planning. Technology has augmented human capacities to fight all manner of previously determining conditions—those of velocity, longevity, health, reproduction, climate. The dream of developing space colonies to house wealthy—or alternatively, excess—populations bolsters the sense that ‘more technology’ will miraculously solve the problems of resource distribution. The war against nature, against humanity’s very substance, will be won by creating utterly simulacral ecologies in order to inhabit completely artificial capsule environments.

Can the magical thinking of technological advancement—we don’t know what science will uncover, but we know eventually it will be useful—be brought into alignment with policies of ecological balance and sustainability, which weigh historically validated precedents alongside innovations? At this threshold moment, it is visual artists who are at the forefront in asking: can we imagine and use outer space differently, not as an experience of economic privilege, military conquest or libertarian isolationism? To reclaim a progressive project of speculation in outer space requires new imaging, as well as revolutionary new forms of invention: in short, a new space age, not an age of ‘NewSpace’.