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IMAGES OF PLACE IN AMERICAN SPACEFLIGHT, 1958 - 1974

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF THE HISTORY OF SCIENCE

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Abstract

This project is a cultural history of images of place in the American space programs of the 1960s, focused on images of Kennedy Space Center (KSC), where the actual launches of rockets took place, and the Manned Spacecraft Center (MSC), where mission planning and astronaut training, and eventually mission control, were located. I consider images of KSC and MSC both in terms of the information they contain about the cultural meaning of a NASA *center* and of such places, but also as representations of a larger cultural geography of spaceflight places. The idea of a NASA center was not a recognizable entity in the early 1960s. Kennedy Space Center, for example, was in some ways an outgrowth of Air Force and Army launch facilities on Cape Canaveral, from which it borrowed some of its physical facilities and operational practices. The Manned Spacecraft Center was very similar to the suburban corporate campuses that began to be built in the post war period, and the community that grew up around it followed the familiar pattern of middle class suburban developments elsewhere in the country. In the history of spaceflight buildings are prominent loci of activity and meaning — but so also are tracts of land, wildlife refuges, turning basins, stadiums, freeways, archaeological sites, swamps, lakes, office parks, suburban neighborhoods, and swimming pools. In short, both the places where spaceflight activities take place, and the images that document and constitute those places matter. In the history of space exploration, both placemaking and imagemaking, two processes that are intimately intertwined, contribute to the making of larger cultural meanings about human spaceflight in the 1960s.

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1. Introduction

Rocket gantries, their iron oxide red painted planes and pipes corroding in the sun and salt air, laying on their sides like massive skeletons, sink slowly into the swamp. Vines tangle around the beams and spill onto the floor of a concrete cable way. The rusted, empty eye of the launch ring of Launch Complex 34 gazes up a clear blue sky. These images of decay and dereliction were made by photographer Roland Miller at Cape Canaveral, the site of the American space program's most spectacular launches. Miller published in *Abandoned in Place: Preserving America's Space History* in 2016, as a document of the abandoned and decommissioned places and technologies of spaceflight in the United States.[1] The book testifies to both the ceaseless innovation and change that animates technology, and the inescapable entropy of the landscapes which consume the discarded infrastructure of cancelled and completed programs. *Abandoned in Place* he project provides access to many of the unseen places of spaceflight, as most are closed to the public or within secure military installations, but as a document of the antiquity of the space program, it is not without precedent.

In the late 1960s, the Real Estate Office at Kennedy Space Center began its own documentation of the decaying facilities of the then decade-long American space program. Initiated by a Real Estate Officer named Joseph Hester, the Ad Hoc Committee on Temporary Facilities was tasked with evaluating all of the structures NASA had appropriated when it acquired the land for KSC, and determining what to do with each. Most of the buildings had been homes, purchased or condemned during

1 Roland Miller, *Abandoned in Place: Preserving America's Space History* (The University of New Mexico Press, 2016).

acquisition, and were used by NASA as interim facilities for laboratories, management training, and storage.[2] A large multi-level concrete block structure surrounded by intersecting power lines and fronted by a broad sand street "was a former restaurant [...] now used by Public Affairs for storage." "Clark's Restaurant" was slated by the committee for disposal as soon as the material stored there could be relocated.[3] (Figure 1.1) The committee's earlier documentation of decaying structures shares none of Miller's aesthetics, and in fact much of Hester's original justification for disposing of the buildings was to "improve appearance" at Kennedy Space Center as the climactic Apollo missions to the moon approached and the center's public visibility increased considerably. These "unsightly" buildings no doubt also represented to NASA the center's infancy, in the years before permanent facilities could be constructed and every sound structure on the site had to be utilized to accomplish its mission.

Like Miller's photographs, images of the temporary buildings at the Cape are both a record of the places and infrastructures of spaceflight in the United States and a document of their impermanence. Filed with Hester's request to convene the committee and its associated documents are photographs of each structure and brief descriptions of what each building was originally, what it became when NASA arrived and took it over, and what it should become at the close of the first decade of American spaceflight.

2 Joseph Hester, to Director of Administration, March 11, 1969; Ad Hoc Committee on Temporary Facilities January-March 1967; Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Directorate of Design Engineering, Real Estate Branch 1963-1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

3 Photograph, NASA K8-998, n.d.; Ad Hoc Committee on Temporary Facilities January-March 1969; Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Directorate of Design Engineering, Real Estate Branch 1963-1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

These records contain both visual information and information about vision--a history of each place, and a vision for its future role within the space program. They are representations of *place*, proof of the physicality and terrestrial geography of the space program, and evidence that this geography has a *history.* In short, both the places where spaceflight activities take place, and the images that document and constitute those places matter. In the history of space exploration, both placemaking and imagemaking, two processes that are intimately intertwined, contribute to the making of larger cultural meanings about human spaceflight in the 1960s.

This project is a cultural history of images of place in the American space programs of the 1960s. Like the committee's photographs, there exist many images of NASA's spaceflight infrastructures and facilities, the communities which surround NASA field installations, and the lives of people who lived and worked in such places. These images also contain visual information about the places of spaceflight, as well as information about the *vision* of spaceflight in the 1960s. I focus on images of Kennedy Space Center (KSC), where the actual launches of rockets took place, and the Manned Spacecraft Center (MSC), where mission planning and astronaut training, and eventually mission control, were located. I consider images of KSC and MSC both in terms of the information they contain about what a NASA *center* is and the cultural meaning of such places, but also as representations of nodes in a larger cultural geography of spaceflight places which extends from the suburban homes of astronauts to the beaches of Florida's Atlantic coast.

Beyond the many images of outer space created by spaceflight program in the 1960s, images of NASA's activities on earth helped to construct a sense of place in and around the specialized facilities of MSC and KSC. In short, the locality of space program places matters. It matters, for instance, that MSC was knitted into a city a distinctive vision of its future, and it matters that KSC was built on and landscape imbued with environmental meanings tinged with nostalgia for empire. These centers were not isolated installations hermetically sealed off from the surrounding community, but rather active in shaping their surroundings and constantly being shaped in turn by the places into which they were built. The images generated by these centers, and about them in the larger media landscape of the midcentury United States, were integral both the construction of the identity of each center, and to the public image of human spaceflight in the 1960s. Each chapter explores the way that NASA centers were connected to larger currents of midcentury American culture, from the rise of corporate capitalism and the "Organization Man," and the suburbs he and his family called ome, to the changing role of women in the new high technology workplaces of the space program, and extending to the localized image of nature and the reformulation of the American frontier in the age of spaceflight.

The idea of a NASA center, which is culturally heavy and self-explanatory in the twenty first century, was not a recognizable entity in the early 1960s. Instead, NASAs field installations were modeled on existing physical and organizational structures, such as those found in large corporations and within the military. Kennedy Space Center, for example, was in some ways an outgrowth of Air Force and Army launch facilities on

Cape Canaveral, and borrowed some of its physical facilities and operational practices from those predecessors. Much of NASA's initial infrastructure, particularly for research, came from its direct predecessor, the National Advisory Committee on Aeronautics (NACA). The Langley Memorial Aeronautical Laboratory in Virginia, the Lewis Flight Propulsion Laboratory in Ohio and the Ames Research Center in California all came under NASA control in October, 1958, along with flight research stations and offices at Edwards Air Force Base, Wallops Island, and Wright-Patterson Air Force Base.A year after NASA's formation, the agency began construction on its own new facilities, starting with the Goddard Space Flight Center in Maryland, and including the Manned Spacecraft Center, Kennedy Space Center, and Electronics Research Center in Massachusetts by the end of NASA's first ten years in existence.[4]

I focus on the Manned Spacecraft Center and Kennedy Space Center as these two sites received the most media attention in the 1960s, and were perceived as the twin hearts of NASA's human spaceflight programs. MSC, after the installation of Mission Control there in 1964, became the nerve center, controlling the operational aspects of the flight from the ground. KSC was "America's Spaceport," and transformed the image of Cape Canaveral as a military missile range into a futuristic launch site for civilian space programs. These two sites also provide two distinct case studies in the placemaking practices of the American space program. MSC was built from the ground up, on a plot of undeveloped land donated to NASA by Rice University. KSC, however, was built into and on top of both existing military facilities and residential and agricultural

4 Jane Van Nummen and Leonard C. Bruno, with Rover L. Rosholt, "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration, NASA SP-4012 (1976): 17.

spaces. These two modes of land acquisition and use highlight the variety of ways in which NASA facilities came into being, and offer varying examples of the way the space centers became integrated into their surroundings.

The places of human spaceflight have endured since the 1960s, but the animating missions of human spaceflight programs, and the social and cultural context these projects lent to NASA centers, have not. The places I consider in this study, while mostly complete, occupied, and operational by 1965, have never been fixed. The geography of their sites changed when more land was acquired or certain areas were reopened to the public. New facilities have been added to service new types of launch vehicles and spacecraft, and old buildings have been demolished. And the culture of spaceflight has changed as well. Women joined the astronaut corps in the late 1970s, and the first woman director of Johnson Space Center, Carolyn Huntoon, was appointed in 1994. In 1974, the Manned Spacecraft Center was renamed the Lyndon B. Johnson Space Center, and only recently NASA has updated its own style guide to recommend that writers no longer use the term “manned” to refer to crewed spaceflight. But the neighborhoods where astronauts lived in the 1960s are still quiet, affluent suburbs and the Merritt Island National Wildlife Refuge still attracts birdwatchers and beachgoers. And although public interest in spaceflight has declined since the end of the space shuttle program in 2011, new space places are now being constructed to service commercial spaceflight. This study contributes to an understanding of the history of space places as sites for the construction of meaning about the project of human spaceflight and the social and cultural forces that shaped it.

Vision and Visuality in the Cultures of Spaceflight

Placemaking is not only a series of physical practices, such as the spatial arrangement of NASA facilities and their architectural form, but includes *representations* of these places, which are my chief concern in the following chapters. The act of creating a representation of a place, say an artist's concept of a new building or a written description of a landscape or even an explanation of a new facility in a memo, is integral to the construction of the identity of that place. For example, the employee newspaper of KSC often printed "pin-up girl" style images of women employees. I argue that the inclusion of these images demonstrates that the newspaper was pitched to the "male gaze" of the majority of employees who were men.[5] Such representations of women workers at NASA marginalized their contributions to the high technology project of human spaceflight, and contributed to a dominant image of KSC as a masculine place. Thus the kind of *looking* that happened in response to these pin up images was also a contribution to the identity of KSC, and in this respect both are part of a larger visuality of space program centers.

The incredible volume of images created by the space program is not incidental to its mission of conducting the spaceflight operations of American space program. According to the Space Act of 1958, under which the agency was established, NASA's three functions are two plan and carry out aeronautical and spaceflight activities, to ensure

5 Mulvey, Laura."Visual Pleasure and Narrative Cinema." Leo Braudy and Marshall Cohen, eds., *Film Theory and Criticism: Introductory Readings*. (Oxford University Press,1999): 833-44.

that scientific participation is accommodated in these activities, and to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results therof."[6] Thus fully a third of NASA's mission was to create and distribute public information about its activities. The Act also specifies that all information about the programs must be made public unless they are classified for national security reasons. In contrast to the Soviet space program, which maintained a high degree of secrecy about its activities, these provisions conferred on NASA's public affairs products and activities an air of transparency that was tinged with ideological implications.[7] NASA's administration of human spaceflight was seen as open, democratic, non-military in nature and fully available to public scrutiny, whereas the Soviet program was shrouded in secrecy and perceived as a direct threat to the United States. The volume of images output by NASA in the 1960s was both part of its mandate and part of the ideological framing of the space race as a contest between cultures. The visuality of the space program is thus both a body of sources open to analysis as well as a political and cultural act.

The theoretical framework of visuality was introduced in the late 1980s and contributed to the development of the interdisciplinary field of visual culture.[8] As a way to "historicize modern vision," visuality can serve to demonstrate the historical contingency of certain ways of looking, by directing attention to who gets to look and why, and by contextualizing images and representations as contingent objects produced and

6 "National Aeronautics and Space Act of 1958," Public Law #85-568, 72 Stat., 426. July 29, 1958. Available online: https://history.nasa.gov/spaceact.html (Last accessed May 6, 2019).
7 Asif A. Siddiqi, *Sputnik and the Soviet Space Challenge* (University Press of Florida, 2003): 169-170.
8 Hal Foster, ed., *Vision and Visuality* (The New Press, 1998). See also Marita Sturken and Lisa Cartwright, *Practices of Looking: An Introduction to Visual Culture* (Oxford University Press, 2012).

consumed by embodied subjects.[9] Such representations are not always images, but rather a variety of components in more general, modern impulse to, as Nicholas Mirzoeff has put it, "picture or visualize existence."[10] I use *visuality* in this study to denote the range of looking and image making practices that contribute to a sense of place at NASA field installations.[11] For instance, NASA provided many tools for visualization to employees planning to move to Houston in the 1960s, such as a checklist for purchasing a home as well as physical photographs of neighborhoods and schools, to help employees visualize, and eventually realize, a new life for themselves in a new city and workplace. Both the actual photographs, and the checklist which prompted employees to carefully visually examine the houses they might purchase and their prospective neighbors, are parts of this visuality, and both were tools for establishing and understanding a sense of place for new employees. NASA provided to its employees such images and tools as a way to create a cohesive identity for workers, who shared the new places they articulated for work and life.

There are a variety of ways in which the visuality of the space program has been handled by scholars and historians of spaceflight. Historian Anne Collins Goodyear has described the place of NASA's Art Program, through which the agency invited artists to document human spaceflight missions, as a way to 'humanize' NASA's projects and to

9 Foster, *Vision and Visuality*, ix.
10 Nicholas Mirzoeff, ed., *The Visual Culture Reader* (Routledge, 1998): 6.
11 I have previously theorized a visuality of space program images in relation to the construction of the astronaut as an icon of human interaction with technology. See Anna Reser, "The Body of the Astronaut as a Body of Images: The Visuality of the American Space Program, 1959-1969," (Master's Thesis, University of Oklahoma, 2015). See also David A. Mindell, *Digital Apollo: Human and Machine in Spaceflight* (The MIT Press, 2008). For a critique of NASA's modelling of this human/machine interaction as an unsuccessful representation of posthumanism, see Melanie Ann Rosen Brown, "Posthumanity's Manifest Destiny: NASA, Its Contradictory Image and Promises, and Popular Culture," (PhD Dissertation, University of Central Florida, 2004).

leverage the symbolic qualities of images to define NASA's public identity.[12] Design historian Nicholas de Monchaux has written about the complex history of the spacesuit as a cultural icon, showing how the evolution of spacesuit aesthetics track with the maturation of the space program from an originating imaginative vision inflected by science fiction to that of a rational, managed, government program.[13] De Monchaux pushes his analysis of the iconic images of the space program as far as arguing that "[f]rom the perspective of Kennedy's knowledge of the media's power in the Cold War, the entire effort to go to the moon should be rightly understood as an elaborate apparatus for the production of a single television image."[14] While I believe that de Monchaux overstates the case, his point about the production of images being central to the ideological imperatives of the space program of the 1960s extends as well to images of NASA facilities. Ensuring, for example, that MSC looked and operated like a prototypical corporate campus was one way to signal the superiority of capitalism as an organizational principle for spaceflight.

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12 Anne Collins Goodyear, "The Relationship of Art to Science and Technology in the United States, 1951-1971: Five Case Studies," (PhD Dissertation, University of Texas at Austin, 2002): 18-22. See also Collins Goodyear, Anne. "NASA and the Political Economy of Art," in Julie F. Codell, ed. *The Political Economy of Art: Making the Nation of Culture* (Fairleigh Dickinson, 2008): 191-206. Visuality accounts for practices of looking in addition to the production of images. Jennifer Levasseur considers not images of astronauts, but rather those created by astronauts, situating photographs made in space within a larger history of exploration and documentation photography. See Jennifer Levasseur, "Pictures by Proxy: Images of Exploration and the First Decade of Astronaut Photography at NASA," (PhD Dissertation, George Mason University, 2002). Historian of spaceflight Margaret Weitekamp has examined the ways in which images of "cute" space vehicles affect public perceptions of spaceflight programs. See Margaret A. Weitekamp, "Softening the Other: The Space Shuttle as Plaything and Icon," in Anne Collins Goodyear and Margaret A. Weitekamp, eds., *Analyzing Arts and Aesthetics*, 88-103 (Smithsonian Institution Press, 2013).

13 Nicholas de Monchaux, *Spacesuit: Fashioning Apollo* (The MIT Press, 2011). Many scholars have analyzed the astronaut as an iconic figure. See for example Michael J. Neufeld, ed., *Spacefarers: Images of Astronauts and Cosmonauts in the Heroic Era of Spaceflight* (Smithsonian Institution Scholarly Press, 2013). For an account of the pre-NASA construction of the astronaut, see Ernest Jordan Bimm, "Anticipating the Astronaut: Subject Formation in Early American Space Medicine, 1949-1959," (PhD Dissertation, York University, 2018).

14 de Monchaux, *Spacesuit*, 147.

Space, Place and "Space Places"

As with the other scales at which my account describes the places of spaceflight, concern for *where* the efforts of spaceflight happen, when they are not happening in outer space, is a productive way to bring spaceflight history into conversation with studies of gender, the built and natural environment, and the history of technology.[15] This study approaches place then as a series of thematic engagements, in which gender, nature, and technology are variously at the fore, and in which different conceptions of place can illuminate the connections between spaceflight and aspects of American social life. I analyze the ways in which the built and natural environments of the space program contribute to the public images of KSC and MSC, and of NASA more generally. I draw on sociologist Thomas Gieryn's theoretical discussion of the ways that the built environments in which science and technology projects take place structure and stabilize the social life of those projects.[16] I broaden Gieryn's maxim in this study to account not only for the new buildings that NASA constructed but the installations themselves and the way the new centers impacted their surroundings. In the history of spaceflight buildings are prominent loci of activity and meaning — but so also are tracts of land, wildlife refuges, turning basins, stadiums, freeways, archaeological sites, swamps, lakes, office parks, suburban neighborhoods, and swimming pools. In Gieryn's examination of the Cornell Biotechnology building, he notes that it "is a site for people and organizations to define themselves and pursue their goals, but also one where those meanings and purposes get structured and constrained." Gieryn's point is that the resulting "new and distinctive networks that biotechnology comprises," are "becoming

15 For the role place plays in conceptions of outer space, and an overview of geographical and anthropological theories of place, see Lisa Messeri, *Placing Outer Space: An Earthly Ethnography of Other Worlds* (Duke University Press, 2016).
16 Thomas F. Gieryn, "What buildings do," *Theory and Society* 31, (2002).

social structure in and through the design and construction of new research centers…" The space centers did not merely *house* the space program, they helped to construct the social, cultural and organizational structures of the space program and their public image.

It is crucial to note, as Gieryn does, that "buildings stabilize *imperfectly*." The stability that a built environment imparts to the projects it houses, and on the people who use it, is temporary and always in the process of becoming. In the case of the Cornell building's stabilization, Gieryn contends that:

> The social structure of biotechnology is shaped by choices made during the design of the building — for example, what people and functional activities are included or excluded, and how are these allocated in architectural space? The finished and occupied building measures a reorganized set of institutional arrangements, interpersonal relations and research practices now routinized and normalized into a more stable, enduring and constraining form.[17]

I describe the space centers in this study in much the way that Gieryn uses *building* in his, in that they are "sites for people and organizations to define themselves and pursue their goals." The creation of MSC and KSC entailed the creation of new organizations and work cultures in addition to new facilities, and both were tasked from their inception with fulfilling the national goals of human spaceflight. But NASA field installations were not only collections of buildings, but also incorporated other structures such as regions and cities, launch pads, landscaping, undeveloped land, and the communities and homes of individual employees. The more expansive term *place* better accounts for the multiple configurations and scales of the relationships between the built and natural environments of spaceflight and the organizational and cultural structures of the 1960s.

17 Ibid., 36.

I identify a series of “space [program] places” which range in scale and complexity from suburban living rooms in the leafy communities of southeastern Texas to the continental configuration of field installations, contractors and universities that NASA achieved in the 1960s.

The terms *space* and *place* have both diverse and diffuse meanings. As geographical terms, they are most generally understood as the container in which matter is configured, and specific configurations of matter and meaning that are contained within space, respectively. Some theorists have reversed these meanings, but in general space can be understood as the general and “place” the particular. The theories of cultural geography that underpin my deployment of place grew out of critiques of the opposition of space as universal and place as particular. In the 1950s and 1960s, space was regarded by physical geographers as the “absolute container,” the basic a priori geometry in which matter is configured. Place was then understood as the particularity or locality of space, having been marked in some way, especially by human activity.[18] Place became associated with “primitive” or “traditional” lifeways while assigning the apparent placelessness of modernity and values associated with technology and “progress.” More recent theories of cultural geography have sought to unsettle the neutral, continuous, a priori model of space to argue that space is just as constructed and as socially and culturally contingent as is place. The marginalization of place as mundane and quotidian —– which often manifested as place being understood as gendered or raced in ways that space was not —– presumed to be a distinction that privileges the mass-produced sameness of modernity and denigrates the situated,

18 Phil Hubbard, Rob Kitchin and Gill Valentine, *Key Thinkers on Space and Place* (Sage, 2004): 4.

individual lifeways and meaning making of people and communities.

While it can be argued that preserving the category of place, instead of re-theorizing space to account for the particular, further reifies this distinction, I use place in part because I am describing many modernist entities that have been understood as variously *placeless*. Calling the corporate campus of MSC a place, instead of a space, helps call attention to its distinctiveness both at the scale of the site itself and within the larger cultural flows in which MSC is a *type* of space. For instance, historian Peter Redfield argues that the technologies of spaceflight reflect "one central ambition of a modernist ethos [that] could be described as the erasure of location in nature."[19] In his study of spaceflight installations in French Guiana, Redfield argues that while technological aesthetics of space centers might suggest the mobility and continuity of standardized, modern spaces, their locality matters, and gives the lie to the notion that such installations are merely or only examples of a standardized kind of space that constructs and constrains predictable, universal social and cultural conditions. Redfield considers the contrast between "the careful, occasionally numbing detail at the root of an ethnographic monograph describing a traditional society and it particular milieu [...] with the wide sweep of a theoretical discussion of modern existence [...]."[20] By modelling itself on the standardized *type* of the modernist corporate campus, MSC resisted the particularity and specificity of place. Even something as extraordinary as the launch facilities at KSC still in some ways pretended to the model of an airport in calling itself "America's Spaceport."[21] I also want to resist the simplification of space in describing

19 Peter Redfield, "Beneath a Modern Sky: Space Technology and Its Place on the Ground," *Science, Technology and Human Values* 23, no. 3 (Summer, 1996): 254.
20 Ibis., 255.
21 Airports, like shopping malls and other such standardized places, are the central objects of Marc

these centers, and to subvert the marginalization of place as an analytic reserved for the primitive, the undeveloped, the feminine, and the traditional. I will describe two major ways in which KSC and MSC became distinct places during the period of their physical construction; 1) how the spatial and organizational models were incorporated into the formation and 2) the way the potential placelessness of these models was undercut by the locality of each installation. MSC was designed to resemble and function like a corporate campus, but its surroundings in Houston shaped its public image in ways that are specific to its location. Similarly, the image "Spaceport" of KSC relies not on the model of an airport or even science fiction, but rather on the specificity of the natural landscape into which it was built.

An important component of my analysis of place for each of the space centers implicates gender in the placemaking practices at KSC and MSC themselves, and in their surrounding communities. Feminist geographer Doreen Massey has written extensively about space, place and gender, arguing that the "gendering of space and place both reflects and *has effects back on* the ways in which gender is constructed and understood in the societies in which we live."[22] Massey considers the geographical construction of gendered norms, and how these norms shape the access that women have to this labor and the places in which it takes place. In high technology workplaces such as those created for the space program, the work of "long hours on knotty problems" require that "such employees do not do the work of reproduction and of caring for other people."[23] I extend this formulation to examine two groups of women.

Augé's theory of "non-places." See Marc Augé, *Non-Places: An Introduction to Supermodernity* (Verso, 2009).
22 Doreen Massey, *Space, Place and Gender* (University of Minnesota Press, 1994): 186.
23 Ibid., 190.

The first were those who in the places of spaceflight were marginalized as “pink collar” workers, and the second is those women who tended to the domestic concerns of their husbands who worked for the space program in constructing their homes and communities against the gendered norms of these high technology workplaces. This formulation comes from Massey’s work with collaborators on science parks as places which often pretend to a radical vision of the future but which replicate and reinforce the ambient class and gender divisions of the societies in which they are constructed.[24] Representations of NASA centers, created by NASA itself and by outside observers, follow this same pattern particularly where gender is concerned. Depictions of NASA as a futuristic enterprise composed of new, rationally managed workplaces and as an avatar of progress conflicted with representations of women workers as marginal, anomalous, sexualized figures and with representations of the homes of space workers as conventional, conservative, safe domestic spaces that enshrined and enacted restrictive mid century gender norms. Images of domesticity are integral to understanding the places in which spaceflight efforts took place, rather they are integral. It is often against such images that the public understanding of spaceflight programs was constructed.

In this study, my preference for the term *place* as my main category of analysis is not a prelude to a granular, ethnographic approach to my subject. Instead I will be relying on understandings of space and place that operate at much larger scales, and which

24 Doreen Massey, et. al., *High Tech Fantasies: Science Parks in Society, Science and Space* (Routledge, 1992): 4-5. While the science parks in question are projects of private enterprise, and while the empirical portion of this study concerns parks in the UK, the authors note that the basic model of these places comes from the US in the 1960s and 70s and their institutional model shares many characteristics with NASA centers.

implicate the space program in particular in the currents of the culture and politics of the postwar period, including the ideological and strategic imperatives of the Cold War, the changing gender norms in the workplace and the home, the height of corporate capitalism and "organization" culture.

Geographer Matthew Farish has offered a historical geography of the Cold War which posits as one of its most enduring effects a sweeping reconfiguration of geographical understanding in the postwar period in terms of militarization.[25] Farish's analysis of the geography of the Cold War is categorical, in that it seeks to describe the creation of specific geographies — the globe, the continent, the region, the city — and to trace their deployment as strategic concepts. His object is not to examine these spaces themselves, but rather the processes, people, and entities that animated and codified them, and the strategic and cultural reasons they did so. The places of the space program that identify are also part of this Cold War geography, though they are curiously absent in popular memory, and often in written histories as well. There is, for instance, no index entry for NASA in Farish's study. I draw the history of spaceflight into closer contact with the cultural and political imperatives of spaceflight in the context of the homes and suburban communities of astronauts and space workers, but other geographies that emerged in the postwar period also encompass the installations of the space program. NASA's facilities are part of imagined geographies such as the "Gunbelt," which describes the regional accretion of military-industrial complex activities

25 Matthew Farish, The Contours of America's Cold War (Minnesota University Press, 2010). See also Gabrielle Hecht, ed., *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (The MIT Press, 2011) and Naomi Oreskes and John Krige, eds., *Science and Technology in the Global Cold War* (The MIT Press, 2014). For more on cartography and technology in the twentieth century, see Laura Kurgan, *Close Up At a Distance: Mapping, Technology & Politics* (Zone Books, 2013).

in a a broad inverted arc that reached from the west coast, down across the south, and up the southern part of the eastern seaboard.[26] Houston, aided by NASA's arrival in the 1960s, was classified by urban studies scholars in the 1970s as one of the "Sunbelt" cities that rose to prominence in the southern United States as a result of increased defense spending and the concomitant accumulation of aerospace and technology firms.[27] I follow Farish in taking these geographies not as given descriptions of space, but as objects created for specific reasons in themselves. Where the geographies of the Cold War were drawn and redrawn for strategic reasons "such that the United States was nominally dedicated to fighting *and* preventing the Cold War at every scale," the places of spaceflight in this study were at the time of their creation in the early 1960s were oriented toward a public image of spaceflight as an expression of American technological and cultural superiority.[28] The built environments of NASA facilities, which were embedded in these larger geographical structures, were designed in particular to fit with American ideas about corporate, capitalist culture and aesthetics.

In analyzing the built environments of these workplaces, specifically that of MSC in Houston, I rely on a framework from architect Louise Mozingo's history of suburban corporate architecture. Located about 20 miles southeast of metropolitan Houston, MSC also fits Mozingo's model of the suburban corporate campus.[29] Mozingo argues that

26 Ann Markusen, Peter Hall, Scott Campbell and Sabina Deitrick, *The Rise of the Gunbelt: The Military Remapping of Industrial America.* (Oxford University Press, 1991). For an account of this process of accretion and change in southern California, see Peter J. Westwick and William Deverell, eds., *Blue Sky Metropolis: The Aerospace Century in Southern California* (Huntington Library and University of California Press, 2012).
27 For an overview of "sunbelt" literature, see Matthew D. Lassiter and Kevin M. Kruse, "The Bulldozer Revolution: Suburbs and Southern History since World War II," *Journal of Southern History* LXXV, No. 3 (2009): 691-706. See also Bruce J. Schulman, *From Cotton Belt to Sunbelt: Federal Policy, Economic Development, & the Transformation of the South, 1938-1980* (Duke University Press, 1994).
28 Farish, *The Contours of America's Cold War*, xiii.
29 Louise A. Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (The MIT

these new corporate landscapes transformed rapidly growing postwar suburbs into seats of high technology, capitalist power. These campuses used the visual language of the pastoral in their design and landscaping to convey that these facilities housed research and development for companies, drawing on aesthetic associations with university campuses. The actual architecture of MSC, while certainly constructed for an extraordinary purpose, is a good example of the efficient, economical mid century modernism of government architecture in the United States.[30] As part of a government agency, MSC was bound to adhere to certain standards for cost efficiency that did not affect more lavish corporate campuses, but the aesthetic effect of the completed center's landscaping, water features, and campus-like arrangement of modernist buildings was much the same. These corporate campuses would have functioned as a model for what MSC would become in the early 1960s. But it is in the specificity of MSC's function and of the influences it exerted on its surrounding communities that an analysis of place, rather than space, offers new vantage points. NASA's installation was not simply another corporate headquarters. Its role as a visible and integral part of human spaceflight programs in the 1960s contributed to a specific sense of place — one inflected by a progressive, future-oriented vision of technology — both at MSC and in Houston more broadly.

NASA centers are built environments, but they are also *natural* environments. On the east coast of Florida, for example, observers wrote about a high technology spaceport being built in what they saw as a wilderness of undeveloped marsh and palmetto using

Press, 2011). On the suburban grassroots of the New Right, see Lisa McGirr, *Suburban Warriors: The Origins of the New American Right* (Princeton University Press, 2001).
30 Robinson & Associates, Judith H. Robinson, and Stephanie S. Foell, *Growth, Efficiency, and Modernism: GSA Buildings of the 1950s, 60s, and 70s.* (General Services Administration, 2003).

a mode of landscape description borrowed from colonial writing about the tropics. David Arnold has termed these representational conventions, which depict the tropics as dangerous, primitive places beset by unbearable climate and disease, the discourse of *tropicality.*[31] I argue that both NASA and outside observers mobilized tropicality as a placemaking practice which heightened the apparent contrast between high technology and nature at KSC, a juxtaposition that remains integral to the institutional and cultural identity of the center. In my analysis of this discourse, my study shares an affinity with environmentally-oriented space histories that analyze encounters of spaceflight with nature and the environment in the United States and in a transnational context.[32] These histories, like my account of nature at KSC, emphasize the importance of the environment on earth from and through which spaceflight projects are produced.

Spaceflight in Cultural Histories of Technology

MSC and KSC were both constructed in the early years of the 1960s, in parallel and in service to the same ultimate goal of completing a crewed mission to the moon by the end of the decade. Beginning in 1961, NASA appropriated funds for and constructed new facilities to meet the needs of a crewed lunar landing program. After the formation

31 David Arnold, *The Problem of Nature: Environment, Culture and European Expansion*, (Wiley-Blackwell, 1996).

32 On orbital debris and nuclear contamination in the arctic, see Lisa Ruth Rand, "Falling Cosmos: Nuclear Reentry and the Environmental History of Earth Orbit," *Environmental History* 0 (2019): 1-26. See also Lisa Ruth Rand, "Orbital Decay: Space Junk and the Environmental History of Earth's Planetary Borderlands," PhD Diss., University of Pennsylvania, 2016. On environmental policy and Antarctic analoges, see Annie Handmer, "Wilderness or Open Space? Contextualising Environmental Concern in the Second Space Age," *Technology's Stories* March 13, 2019. Online: https://www.technologystories.org/wilderness-or-open-space/ (Last accessed March 21, 2019). See also Asif Siddiqi, "Tsiolkovskii and the Invention of 'Russian Cosmism': Science, Mysticism, and the Conquest of Nature at the Birth of Soviet Space Exploration." In *Science, Religion and Communism in Cold War Europe*, eds. Stephen A. Smith and Paul Betts, 127-156. Palgrave Macmillan: London, 2016. These spaceflight histories are part of a larger environmental turn in studies of science and technology. For a thorough introduction, see Dolly Jørgensen, Finn Arne Jorgensen, Sara B. Pritchard, eds., *New Natures: Joining Environmental History with Science and Technology Studies* (University of Pittsburgh Press, 2013).

of the National Aeronautics and Space Administration, by way of the National Aeronautics and Space Act of 1958, an initial $25 million was dedicated to the construction of facilities and the purchase of equipment.[33] This amount was dwarfed only a few years later by an appropriation of $316 million for fiscal year 1962, following President Kennedy's address to congress in May 1961 establishing the aim of a crewed lunar mission by the end of the 1960s.[34] In 1961, the American space program was just beginning to post major successes and generate public interest. After several false starts and a series of upsetting failures of the Redstone missile, Project Mercury had successfully launched its first two missions and put the first American into space. Under increasing pressure to meet Soviet achievements in human spaceflight, and following President Kennedy's directive to congress to complete a lunar landing before the end of the decade, NASA recieved a massive influx of funding and set about the task of expanding the then-small agency into a continent-scale national project.

Histories of Spaceflight

Histories of spaceflight in the 1960s have addressed the social and cultural aspects of human journeys into space, but not often with a specific focus on the earthly places that facilitated those journeys.[35] For example in his explorations of the role of space exploration in twentieth-century American culture, historian Howard McCurdy has

33 Jane Van Nummen and Leonard C. Bruno, with Rover L. Rosholt, "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration, NASA SP-4012 (1976): 13.
34 Ibid., 19.
35 The most venerable political history of spaceflight in America is Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Basic Books, 1985). Two edited volumes contain essays that engage more directly with the places of the space program, see David Bell and Martin Parker, eds., *Space Travel & Culture: From Apollo to Space Tourism* (Wiley Blackwell/The Sociological Review, 2009) and Michael J. Neufeld, ed., *Spacefarers: Images of Astronauts and Cosmonauts in the Heroic Era of Spaceflight* (Smithsonian Institution Scholarly Press, 2013).

described the ways in which the terrestrial metaphor of the frontier was adapted to animate a vision of spaceflight as a quintessentially American project.[36] For McCurdy the most important cultural meanings attached to spaceflight are those that underpin American imaginations of the act of space flight, rather than those generated by and about its earthly infrastructures. Specific periods of NASA's cultural history have received extensive treatments by historians, such as the Apollo moon landings, which remain the space program's most visible accomplishment.[37] Historian Matthew Tribbe examines the spectacle of the moon landing, and the critical literary and artistic interpretations it provoked, and offers an important corrective to assumptions about the universal popularity of the space program, namely that NASA's vision of itself as the steward of an efficient, well-managed, scientific, cautious project was at odds with the views of those caught up in a changing culture in the 1960s.[38] Tribbe. Its appeal to a white, middle class mainstream whose patriotic faith in technological progress was largely a result of reaping the benefits of such progress, did not transfer to people on the margins who were excluded from the new future it promised.[39] Environmental historian Neil Maher's more recent history of the space program examines the intersections of the social movements of the 1960s with the project for human spaceflight, again focusing on the Apollo program.[40] In his analysis of the mutual engagement of the space program and the environmental movement, Maher argues

36 Howard McCurdy, *Space and the American Imagination*, Second Edition. (Johns Hopkins University Press, 2011): 155.
37 For an oral history of the integration of German rocket scientists into the community in Huntsville, Alabama following WWII, see Monique Laney, *German Rocketeers in the Heart of Dixie: Making Sense of the Nazi Past During the Civil Rights Era* (Yale University Press, 2015).
38 Tribbe, Matthew D. Tribbe, *No Requiem for the Space Age: The Apollo Moon Landings and American Culture*. (Oxford University Press, 2014).
39 For a space program history focused on its spiritual and religious dimensions, see Kendrick Oliver, *To Touch the Face of God: The Sacred, the Profane, and the American Space Program 1957-1975* (Johns Hopkins University Press, 2012).
40 Neil Maher, *Apollo in the Age of Aquarius* (Harvard University Press, 2017).

that the creation of the Merritt Island National Wildlife Refuge at Kennedy Space Center was a response by NASA to to critiques of the agency's environmental impacts.

Broader studies of technology, nature, and culture in the American context also demonstrate the ways that these space places share affinities with related activities. Leo Marx's now-classic 1964 study of American attitudes toward the "machine in the garden" from the 19th century onward provides one such framework. Marx's identification of the animating tensions between the pastoral ideal can certainly encompasses the mid-twentieth century public's fascination with the image of a rocket rising above the thousands of acres of undeveloped palmetto forests that made up most of Kennedy Space Center's area.[41] The image of the rocket launch in American culture is used by David Nye in his study of the "technological sublime," arguing that the rocket launch is the "final avatar of the dynamic, technological sublime after the steamship, the railroad, and the airplane."[42] For Nye, the physicality of the launch is what makes it sublime because the sheer scale of the event mocks the small frame of any camera: "the blinding brightness and subtlety of the colors cannot be broadcast any more than one can transmit the violent roar of the engines, the smell of the fuel mixed with that of the surrounding swampland, or the feel of rocket's thrust shaking the earth."[43] Indeed, the cultural significance of KSC derived in part from its apt evocation of the "technological sublime," an effect that could only be achieved within a landscape that was perceived as empty wilderness. Marx and Nye's theoretical discussions help to illuminate the longstanding discourses about technological powers held in tension with

41 Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford University Press, 1964, 2000).
42 David E. Nye, American Technological Sublime (The MIT Press, 1996): 254.
43 Ibid., 246.

nature as a state of innocence, within which the worlds of KSC and MSC were embedded.

These internal worlds have been described by very robust institutional histories of MSC and KSC which were created under contract to NASA as part of the agency's own history program.[44] Kenneth Lipartito and Orville Butler have co-authored an accessible and thorough history of Kennedy Space Center that covers the earliest origins of the installation through the early 2000s, the period just prior to the end of the space shuttle program.[45] Primarily oriented toward a management history of the center, Lipartito and Butler's account touches on some of the environmental and cultural aspects of KSC. I expand on their suggestions about the way that interpretations of the surrounding environment contributed to constructing meanings about KSC. Henry Dethloff's history of Johnson Space Center covers a shorter time period, chronicling the history of the center from its creation in 1961 through the period of reevaluation following the Challenger disaster in 1986.[46] Like other historical accounts of the MSC-era of the center, Dethloff provides a thorough explanation of the political dimensions of the site selection, which are seen as the key influences on what MSC would become as an institution. Although I am able to draw on Dethloff's treatment for this period, his account

44 Most NASA History publications are available in digital formats and can be downloaded for free online: https://history.nasa.gov/series95.html.

45 Kenneth Lipartito and Orville R. Butler, *A History of the Kennedy Space Center* (University Press of Florida, 2007). For an older, more technical history of launch facilities at Kennedy Space Center, see Charles D. Denson and William B. Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (National Aeronautics and Space Administration, 1978). See also Loyd S. Swenson Jr., James M. Grimwood and Charles C. Alexander, *This New Ocean: A History of Project Mercury* (National Aeronautics and Space Administration, 1989). For a history of Apollo launch vehicles, see Roger E. Bilstein, *Stages to Saturn; A Technological History of the Apollo/Saturn Launch Vehicles* (National Aeronautics and Space Administration, 1980).

46 Henry C. Dethloff, *Suddenly, Tomorrow Came...A History of the Johnson Space Center* (National Aeronautics and Space Administration, 1993)

is less informative than Lipartito and Butler's about the location-based dynamics of the embryonic years following site selection.[47]

Historical studies that concentrate on individual aspects of both MSC and KSC exist in addition to these broader histories. Historian William Faherty has written a synthetic account of Florida's "space coast" that documents the social and economic impacts of NASA activities at KSC. Faherty covers some of the basics of the demographic and cultural changes that came to the Florida coast with NASA, but the main content is a straightforward chronicle of the Apollo program.[48] While he occasionally notes that certain things, such as the Vehicle Assembly Building, were meant to be symbolic, he does not expand on the observation. Similarly, his interpretation of the environment surrounding KSC relies on, rather than analyses, many of the same ideas about nature and technology that my study of KSC contextualizes.

MSC has attracted slightly more attention as a site for specific study, in large part because it housed the Mission Control Center for Gemini and Apollo missions, one of only two places on what is now the Johnson Space Center campus which came to be

47 In addition to many monographs like the individual center histories, NASA regularly publishes edited volumes on the social and cultural aspects of spaceflight, most using the "societal impact" model. See Steven J. Dick and Roger D. Launius, eds., *Critical Issues in the History of Spaceflight* (National Aeronautics and Space Administration, 2006). Available online: https://history.nasa.gov/SP-4702.pdf. Along with *Critical Issues*, Steven Dick has edited a number of important volumes on the history of spaceflight, see Steven J. Dick and Roger Launius, eds., *Societal Impact of Spaceflight* (National Aeronautics and Space Administration, 2007) and Steven J. Dick, ed. *Remembering the Space Age: Proceedings of the 50th Anniversary Conference* (National Aeronautics and Space Administration, 2008). An update on the same theme was published more recently, see Steven J. Dick, ed., *Historical Studies in the Societal Impact of Spaceflight* (National Aeronautics and Space Administration, 2017).

48 William Barnaby Faherty, S. J., *Florida's Space Coast: The Impact of NASA on the Sunshine State*, (University Press of Florida, 2002). Faherty is also not shy about injecting his personal politics into his narrative, for example chastising the construction workers who built KSC as not understanding its "transcendent" purpose and selfishly engaging in work stoppages, though he commends them for stopping short of fully-fledged socialism (48).

designated as a National Historic Landmark. In a recent dissertation, Kevin Brady discusses the impact of NASA on the city of Houston by examining the effects of the agency's presence there on the population and demographics of the region, its communities and educational institutions, and the local politics and economy.[49] I examine how these interrelated factors impact NASA's own internal representations of MSC and its activities in Houston. I bring both of these domains together to better understand MSC as a place that incorporates NASA activities and the larger cultural effects they had on the city, such as the 1960s renaming of Houston's baseball franchise from the Colt .45s to the Astros, and its home field, a new modernist domed stadium called the Astrodome. The history of the practice of mission control in spaceflight has been explored by Michael Peter Johnson in a text that covers Mission Control centers at MSC/JSC in Houston, the Jet Propulsion Laboratory in California, and the European Space Agency in Germany.[50] Johnson argues that the image of mission control was a presentation of high technology under careful, efficient management by experts. Further work on the topic includes Layne Karafantis' analysis of the role of the built environments that house command and control practices in Cold War technology projects in the United States.[51] She examines mission control centers as technologies in themselves, that symbolized the military and political policy of the Cold War. Karafantis argues that MSC's Mission Control Center is the archetypal

49 Kevin Michael Brady, "NASA Launches Houston into Orbit: The Political, Economic, and Social Impact of the Space Agency on Southeast Texas, 1961-1969. (PhD Dissertation, Texas Christian University, 2009). See also Kevin M. Brady, "NASA Launches Houston Into Orbit: The Economic and Social Impact of the Space Agency on Southeast Texas, 1961-1969," in Steven J. Dick and Roger Launius, eds., *Societal Impact of Spaceflight* (National Aeronautics and Space Administration, 2007): 452.
50 Michael Peter Johnson, *Mission Control: Inventing the Groundwork of Spaceflight* (University Press of Florida, 2015). See also Peter J. Westwick, *Into the Black: JPL and the American Space Program, 1976-2004* (Yale University Press, 2011).
51 Layne Karafantis, "Under Control: Constructing the Nerve Centers of the Cold War, (PhD Dissertation, Johns Hopkins University, 2016).

command center on which other such command centers were modeled, serving as the aesthetic and organizational template that informed public understanding of these places.

In Chapter 2 I begin my examination of the places of spaceflight at the scale of the Southeastern United States, within the “space crescent” of NASA centers ringing the Gulf of Mexico. Chapter 2 provides an introduction to KSC and MSC as they appeared in the mid 1960s--not immutable, or even fully finished, but inhabiting both their purpose-built environments and the institutional identities that were constructed alongside their physical forms. This chapter situates KSC and MSC within the larger context of the space program and describes the basic form that each place took in the mid 1960s, and discusses some of the basic institutional history of each. I then consider these realized space places together, as two nodes in a larger network, and as two entangled places connected both by technology and by culture. I argue that the transfer of mission control from Mercury Control at the Cape to the newly-completed Manned Spacecraft Center in 1964 is a moment of identity formation for both centers, and one which shows how they are connected to larger structures of place as with the “space crescent” region of the Southeast. I then consider a cultural transfer that occurred in the opposite direction, bringing the history of the Astros and the Astrodome to bear on the the shared history of MSC and KSC in the 1960s.

Subsequent chapters examine the individual space centers in turn, using different analytic frameworks to consider the early years of the 1960s for both places. In Chapter

3 I analyze the representations and placemaking practices that focus on the environment surrounding the installation of KSC and the significance of the aesthetic tropes of colonization and empire in portrayals of the center. Located on tens of thousands of acres of palmetto forests, marshland, lagoons and seashore, KSC inspired lurid descriptions by observers focused on the apparent contrast between its high tech functions and the wildness of the surrounding landscape. This chapter analyses a number of environmental discourses related to the public representation of Kennedy Space Center in the 1960s. Writers, journalists, and NASA officials all used environmental narratives to help naturalize the presence of the new “Spaceport” on the coast of Florida, in part by characterizing the environment as uninhabited, wild, useless, and populated by disagreeable wildlife. Such narratives were also used to justify the various forms of displacement and disruption that were required to build the Spaceport, including the condemnation of people’s homes and the control of archaeological sites.

Chapter 4 chronicles an often overlooked period in the history of NASA facilities. In the very first years of the 1960s, the agency operated the Manned Spacecraft Center from a collection of temporary facilities in Houston while the permanent campus at Clear Lake was under construction. MSC began as a pair of storefronts in an indoor shopping mall, and existed for the first four years of its institutional life as a set of scattered leased facilities, loosely connected by an ad hoc shuttle system and a series of rental cars. The spatial consolidation of MSC into purpose-built facilities in Clear Lake on land once owned by an oil company, marked an important shift in the organization of the space program, the social and political position of human spaceflight, and the geographic

identification of certain technological aspects of spaceflight such as Mission Control. I argue that the design, construction and completion of permanent facilities in these years was part of the identity formation of MSC and of the image of human spaceflight as an organized, rational enterprise with considerable public and governmental support. An important aspect of this identity and image formation was the social and political character of the communities that grew up around the space center.

Chapters 5 and 6 take up the question of gender as it relates to placemaking at NASA facilities and in their surrounding communities. Chapter 5 argues that the physical spaces created at a launch event were gendered in predictable ways that hove very closely to more general post-war understandings of women's roles in technological fields generally and in the space program specifically. While the center's internal employee newspaper went to great lengths to laud the presence of women workers in the space program, it did so alongside objectifying and marginalizing representations that ultimately constructed KSC as a masculine, high tech space where women workers remained something of a novelty well into the Apollo program. Throughout the files of the Public Affairs Office there is constant discussion and negotiation about how to manage the presence of women at launch day activities and other special events. The most pressing concern was of course the wives of astronauts and of NASA employees and contractors. Often designated as one homogenous group, "wives" were assigned their own spatial areas, while "people" typically referred to contractors or other important guests, who were all men. Mixed groups are carefully described as such, in order to account for the special spatial provisions that apparently needed to be made for women.

In addition, there were a number of VIP women who attended early Gemini launches at KSC who proved particularly troublesome. Celebrities and members of the press who didn't behave in accordance with Public Affairs Office expectations were seen as threatening the tone he hoped to set for these carefully managed events. Most of these disruptive individuals that appear in the archive are women.

Chapter 6 further examines how place was gendered in the American space program by examining how "wives," managed as an undifferentiated group at launches, were individually enlisted into a representational scheme that defined the homes of the astronauts as feminine, safe, predictable spaces and which served as foils in the construction the places of the space program as masculine, dangerous, and chaotic. This chapter draws on *Life* magazine's coverage of the wives of astronauts and their families viewing launches on television from their homes (or carefully constructed home-like spaces). These "vigils" were a central component of *Life*'s coverage of Project Mercury and were aligned with the magazine's larger goal of reinforcing its ideal vision of orderly middle class life. Already American heroes before ever flying in space, astronauts were expected to conform to a strict vision of white, suburban life, and their families were integral to this portrayal. Even when the wife of one astronaut tried to escape the established precedent of observing this vigil from her own house, *Life* magazine arranged for her and her children to witness the launch from a similarly domestic setting at the Cape in order to preserve the trope they had built up with coverage of other launches.

In the conclusion, I outline the possibilities for further study of images of place in the American space program. Attention to the places of spaceflight offers new perspectives on the social, cultural and economic impacts of spaceflight activities on their surrounding communities. While a fuller history of these impacts is called for, there is also a need for contemporary studies which address these effects in the present era of commercial spaceflight and its vision for the future.

2. "What was before is eclipsed by what is becoming…":

The Entangled Places of Spaceflight

In the spring of 1961, James Webb made his case to Vice President Lyndon Johnson for selecting Houston, Texas as the site for NASA's new Manned Spacecraft Center (MSC). If the agency decided to locate MSC in southeast Texas, human spaceflight would be a truly national project with a continental geography. If NASA took advantage of a parcel of land that was offered to NASA by Rice University, Webb argued,

> … these two strong centers [Rice and MSC] would provide a great impetus to the intellectual and industrial base of this whole region and would permit us to think of the country as having a complex in California running from San Francisco down through the new University of California installation at San Diego, another center around Chicago with the University of Chicago as a pivot, a strong Northeastern arrangement with Harvard, M.I.T., and like institutions participating, some work in the Southeast perhaps revolving around the research triangle in North Carolina [...] and with the Southwestern complex rounding out the situation.[52]

Webb envisioned the space program on a massive scale, with field sites and associated contractors and universities in every region of the United States. (Figure 2.1) What Webb described as "the situation" was NASA's integration into the network of government defense installations, university programs, and corporations that formed the postwar military-industrial complex. By the middle of the 1960s, the space program had achieved the continental scale that Webb predicted.

In 1961, the space program entered its most intense period of expansion in the 1960s. Between 1959 and 1965, NASA's budget increased from about $300 million to more

52 James Webb, to Lyndon B. Johnson, Vice President of the United States, May 23, 2961; MSC Site Selection Correspondence 1958-1962; Box 10: MSC Site Selection; Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).

than $5 billion.[53] The construction of new facilities accounted for nearly 17 percent of the agency's total appropriations in the early years of the 1960s and resulted in NASA owning more than 100,000 acres of land by the end of the decade, the vast majority of which was located at the launch facilities on the east coast of Florida. Although NASA still maintained space science programs in these years, the majority of the agency's resources was dedicated to human spaceflight. By the end of the decade, NASA had ten permanent field installations, four of which were constructed from the ground up in the early 1960s. Both centers were created in 1961, and new facilities were more or less complete for each by 1965, the year NASA's employment peaked at more than 400,000 employees, both in house and out of house.[54]

Throughout the 1960s and early 1970s, with public attention to human spaceflight at its height, Kennedy Space Center (KSC) and the MSC were the most publicly visible and important of NASA's massive ground operations. This buildup of people and facilities was necessary to carry out NASA's human spaceflight programs, which after 1961 were oriented toward the goal of a lunar landing. NASA oversaw three overlapping human spaceflight programs in the 1960s and early 1970s, for which it constructed the bulk of its new ground facilities. Beginning simultaneously with the creation of NASA in 1958, Project Mercury lasted until 1963. The first seven astronauts were selected and introduced to the public in 1959. All but one of these seven men flew in the single-person Mercury spacecraft on either ballistic or orbital flights, launched first by Redstone and later by Atlas missiles. Although the United States was bested in its most

53 Jane Van Nummen and Leonard C. Bruno, with Rover L. Rosholt, "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration, NASA SP-4012 (1976): 6.
54 Ibid. 6-9.

important goal for Mercury of orbiting the Earth by the Soviet cosmonaut Yuri Gagarin a month before Alan Shepard's suborbital flight, the American space program was set for massive expansion by the summer of 1961 with the new goal of landing astronauts on the moon.

The next program, conceived of as an intermediary step between Mercury and Apollo, would allow NASA to perfect certain technological aspects that would be essential for a crewed landing on the moon. Project Gemini, initiated in 1961 and running through 1966, was so named because of the two-person spacecraft that replaced the Mercury craft, and it allowed NASA to rehearse procedures such as space walks and the all-important rendezvous of two spacecraft. Gemini spacecraft were launched by repurposed Titan missiles into orbit, where mission times ran to weeks.

The Apollo program began in 1960 and was completed in 1972 with what remains to date the last crewed mission to the moon, Apollo 17. The Apollo launch vehicle, the massive Saturn rocket, was purpose-built for the lunar mission. It was the size of this rocket that necessitated many of the new facilities that were built at the launch complex in Florida, including the Vehicle Assembly Building. Apollo missions utilized a three-person spacecraft, and lunar missions added the two-person Lunar Module for landing on and ascent from the lunar surface. The first lunar landing in the summer of 1969 was an unprecedented technological spectacle that was witnessed on television by hundreds of millions of people around the world.

The two most important field installations for human spaceflight were MSC and KSC. MSC handled the most central and visible aspects of training astronauts and planning missions while KSC was responsible for assembling, testing, and launching rockets. These two centers were important nodes in the network that Webb identified, but they were part of other kinds of geographical structures as well. They were intertwined by a shared mission and the exchange of specific technological functions such as Mission Control. MSC and KSC were also part of regional structures known as the “Gunbelt” and “Sunbelt” as well as the spaceflight-specific arc of NASA facilities ringing the Gulf of Mexico.

The bulk of this study considers the construction of the image of MSC and KSC as individual centers in the very earliest years of the 1960s. In a sense, however, this chapter begins where this study ends: with the completion of primary construction on both centers around 1965. It considers how the more or less “finished” images of each center were linked both by their shared mission and by the larger geographic structures and cultural currents of which they were part. The bird’s-eye view of KSC and MSC reveals two closely linked sites, whose interconnections surpassed their merely being part of the same larger organization and extended to their role in the military-industrial reshaping of the United States and to the more quotidian facets of American life in everything from baseball to tourism. I discuss these large-scale images of KSC and MSC from the mid to late 1960s in turn and trace some of the ways the image of the two space centers was entangled both in terms of the technology of spaceflight and within their larger cultural context.

Images of American Spaceflight

The image and memory of the space program of the 1960s has its own dedicated literature within studies of spaceflight. Many such studies examine actual images such as photographs or artworks made by or about the space program. Others concern social or political imagery, the more intangible stuff of public perception, projected by spaceflight programs. Still others have focused on the spectacle of spaceflight and the larger media culture in which it was observed. All of these approaches can be productively grouped as the “visuality” of the space program. This framework opens for analysis physical and conceptual images, alongside the circumstances of their production, distribution, and reception, in ways that integrates the aspects of spaceflight that are seen as well as the practices of looking by which they are seen. Visuality is about images and looking and about the totalizing framework of vision as a modern phenomenon. Vision is the dominant mode of experience in the modern period, which is exemplified by the Cartesian picture plane, the seeming transparence and objectivity of photography, and in the emergence of mass media in the nineteenth and twentieth centuries.

The space program of the 1960s produced some of the most iconic images of the twentieth century. This visuality that has come to signify a whole host of meanings about American technological and ideological exceptionalism. There are thousands of images of spaceflight freely available for personal and commercial use, making them a popular choice for advertising that draws on space program metaphors like the

"moonshot" or the unofficial motto of "failure is not an option." Imagery from the space program is popular in American politics, as evidenced as recently as 2016, when the Republican National Convention screened a short video tribute to the space program that integrated archival footage from the Apollo program.[55] The moon landing in particular is frequently invoked as the greatest technological achievement of the twentieth century, and held up as an example of inspirational "American know-how," hard work, and determination.

Political scientist Mark Byrnes has written an early study of the political dimensions of NASA's public image and argues that NASA has employed three conceptual images over the course of its history, each of which corresponds roughly to specific periods in the history of the agency. He further argues that NASA consciously shifted its public image to maintain political support for its mission.[56] Byrnes identifies the political images of nationalism, romanticism, and pragmatism as most central to the public perception of NASA's efforts at various points in its history. Nationalism was the image associated with the program's role in the Cold war; Romanticism with adventure and exploration; and pragmatism with the technological and economic benefits that are said to accrue to spacefaring societies.[57] The images that Byrnes identifies are solidified in rhetoric about the space program, and his focus is on metaphor and the stylistic characteristics of the agency's written and verbal communications. I argue that the durability of NASA's public image and that of its centers is a combination of conceptual or rhetorical images and

55 FOX 10 Phoenix. "AMAZING: Great Tribute To Space Exploration - Donald Trump RNC Convention - FNN." Played July 20, 2016. YouTube video, 0:39. Posted July 20, 2016. https://www.youtube.com/watch?v=c8qLg7BxquE (Last Accessed February 22, 2019).
56 Mark E. Byrnes, *Politics and Space: Image Making by NASA* (Praeger, 1994).
57 Ibid., 3.

actual visual images, in addition to the practices of looking and image formation through which they are constructed.

The space program produced hundreds of thousands, if not millions, of images. In NASA's holdings in one branch of the National Archives in Atlanta alone, there are almost 400,000 still images, and NASA maintains extensive digital archives, available to the public.[58] Scholars have engaged with this rich body of images in seeking to understand the cultural implications of spaceflight, which has been a productive answer to critiques of "nuts and bolts" histories of space technology as well as an opening up of the study of spaceflight history to a more diverse array of disciplines. In 2008 at a conference honoring the fiftieth anniversary of the creation of NASA, photographer Michael Soluri offered an analysis of the place of NASA images within the larger history of photography.[59] In addition to producing its own images for technical documentation and for wider public consumption, NASA invited artists to record their impressions of the spaceflight through the NASA Art Program. Historian Anne Collins Goodyear has considered the program and the artworks produced by artists such as Norman Rockwell and Robert Rauschenberg. Collins uses the NASA Art Program as a case study in the relationship between art and technology in the United States in the "space age" years following the launch of Sputnik in 1957, and she argues that the political context of the Cold War affected the relationship of American art to science and technology.[60] Artists in

58 NASA Images are available directly from the recently reconfigured NASA Image and Video Library website: https://www.flickr.com/people/nasacommons/. The agency's Flickr Commons (https://www.flickr.com/people/nasacommons/) rehosts the images that were organized and managed for the agency by the Internet Archive: https://archive.org/details/nasa.
59 Steven J. Dick, ed. *Remembering the Space Age: Proceedings of the 50th Anniversary Conference* (National Aeronautics and Space Administration, 2008).
60 Anne Collins Goodyear, "The Relationship of Art to Science and Technology in the United States, 1951-1971: Five Case Studies," (PhD Dissertation, University of Texas at Austin, 2002): 18-22. See also

this period became increasingly fascinated with new technologies and with scientific methodologies that could be adapted for art making practice.

Art historian John Curley has further developed a Cold War visuality in which he reads the pop art of the 1950s and 1960s against other images and image-making practices of the Cold War that were concerned with the politics of paranoia and surveillance and with the cultural importance of science and technology.[61] Curley analyzes works by Gerhard Richter and Andy Warhol alongside aerial surveillance photos and the images of the conspiracy theory surrounding the assassination of John F. Kennedy. The "visual protocols" that are common to all kinds of visual representation and to the postwar formulation of vision itself are the what define and bind together this Cold War visuality. I use visuality in this study to identify some of the "visual protocols," or representational conventions, which contributed to the creation of an institutional and public image of NASA's two most famous centers in the early 1960s. The conventions of this visuality are especially apparent in images of astronauts, as I have argued in my analysis of Robert Rauschenberg's hybrid man-machine figures in his series of prints about Apollo 11, titled *Stoned Moon*.[62]

Design historian Nicholas de Monchaux utilizes a framework similar to visuality in his study of the spacesuit as an iconic object in the history of spaceflight. He describes a slow layering of symbols that built up the various iconographic figures associated with

Collins Goodyear, Anne. "NASA and the Political Economy of Art," in Julie F. Codell, ed. *The Political Economy of Art: Making the Nation of Culture* (Fairleigh Dickinson, 2008): 191-206.
61 John J. Curley, *A Conspiracy of Images: Andy Warhol, Gerhard Richter and the Art of the Cold War* (Yale University Press, 2013)
62 Anna Reser, "The Body of the Astronaut as a Body of Images: The Visuality of the American Space Program, 1959-1969," (Master's Thesis, University of Oklahoma, 2015).

the space program, as they stemmed from the visuality of aviation. The classic image of the goggled pilot in a white scarf, for example, was replaced in the postwar period by images like that of Wiley Post in a wool suit like an engineer and test pilots and astronauts typifying Barthes' 'jet man' in their pressure suits.[63] De Monchaux further argues that the production of images, especially that of the first human landing on the moon, was the real aim of the space program because it was a perfectly mobile symbolic shorthand for American technological and ideological superiority.[64] The specific images of NASA's centers often offered similar social and political possibilities at various geographic scales. The creation of a Spaceport on Florida's east coast and the transformation of Houston into "Space City USA" rely in part on the image of NASA's centers in these places as a marker of American technological enthusiasm and a modernist, futuristic vision of local and national development.

America's Spaceport: The Image of Kennedy Space Center

KSC is located on the Atlantic coast of Florida about 45 miles east of Orlando. The center's main facilities were constructed in the early 1960s on Merritt Island, inside an initial land acquisition of 88,000 acres stretching from New Smyrna Beach to the north and to Patrick Air Force Base to the south. The total land area of KSC is separated from the mainland to the west by the Indian River, and Merritt Island and Cape Canaveral are separated by the Banana River. (Figure 2.2) As much as chroniclers of NASA's presence in this area have attempted to minimize its human history, the Cape Canaveral region boasts an interesting past. It is among the oldest sites of Spanish

63 Nicholas de Monchaux, *Spacesuit: Fashioning Apollo* (The MIT Press, 2011): 59-65.
64 Ibid., 147.

contact in North America, having been encountered and named in the sixteenth century.[65] Of course, people had lived there for centuries before, among them the Ais people and their earlier ancestors who left behind burial mounds and shell middens that were ultimately encircled by KSC's large perimeter. By the end of the nineteenth century, settler families were growing citrus and sugarcane in the area and fishing the rivers and lagoons. The mainland to the west saw an even more significant population increase during this time, as it became a popular hunting and sporting destination, abetted by the arrival of the railroad in 1887.[66] In the twentieth century, the U.S. military began building up its homeland defense ahead of its entry into World War II, which included the creation of the Banana River Naval Air Station.[67]

Since the late 1940s, the U.S. Air Force had used this area as part of what would be named the Bahamas Long-Range Proving Ground, which allowed for missile testing to be monitored by series of tracking stations in the Atlantic.[68] The Air Force took over the Banana River Naval Air Station and redesignated it as Patrick Air Force Base in 1950.[69] The first launch from Cape Canaveral in 1950 was a modified V-2 rocket, technology recovered from Germany at the end of World War II.[70] Over the course of the 1950s, the Cape was the site of tests of more V-2-adapted missiles as well as newly developed missiles such as the Army's Redstone and Jupiter missiles. The Air Force's Atlas

65 Kenneth Lipartito and Orville R. Butler, *A History of the Kennedy Space Center* (University Press of Florida, 2007): 28.
66 Ibid., 29.
67 Ibid.
68 Charles D. Benson and William Barnaby Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (National Aeronautics and Space Administration, SP-4104, NASA History Series, 1978). Available online: https://www.hq.nasa.gov/office/pao/History/SP-4204/ch1-3.html
69 Lipartito and Butler, *A History of the Kennedy Space Center*, 37.
70 See rocket and the reich

missiles, first test-fired in 1955, were followed by Titan and Thor.[71]

In July of 1960, two years after the formation of NASA, the Marshall Spaceflight Center was established in Huntsville, Alabama. Under the direction of the German rocket scientist Wernher von Braun, this site incorporated facilities, personnel, and land that had been the Army's Redstone Arsenal in the 1950s. At the same time, the Launch Operations Directorate of Marshall was established at the Cape, sharing facilities with the various military missile projects there.[72] In May 1961, President John F. Kennedy announced in an address to Congress that the United States human spaceflight program should attempt a lunar landing before the end of the decade. A few months later at the end of that summer, NASA announced that it would acquire some 88,000 acres on the east coast of Florida on Brevard County's Merritt Island to build the country's first spaceport.[73]

The image of KSC in the 1960s was dominated by its function as a launch complex. A brochure about NASA's operations on the Cape from mid-decade made the case that "[t]he story of the progressive development of the national space program can be traced in the impressive series of significant launchings that have occurred, and will continue to occur, at Cape Kennedy, Florida.[74] The cover featured a photograph of a Saturn I launch, and the back of the brochure included a map of NASA's facilities and launch

71 Roger Launius, *NASA: A History of the U.S. Civil Space Program* (Krieger Publishing Company, 1994): 15.
72 Lipartito and Butler, *A History of the Kennedy Space Center*, 52. For a general overview of Marshall, see *Milestones in Space Exploration* (Marshall Spaceflight Center, 2000): https://history.msfc.nasa.gov/milestones/index.html. Last accessed January 30, 2019.
73 Lipartito and Butler, *A History of the Kennedy Space Center*, 58.
74 "NASA at Cape Kennedy Florida," n.d., ca. 1964-1965. In the collection of the author.

complexes with a route for driving tours. The brochure described the operations of KSC and the field offices and Cape operations of other installations including MSC and Goddard Space Flight Center. KSC was the place where all of the interconnected aspects of human spaceflight came together, both literally in the assembly of spacecraft and launch vehicles and in terms of the image of the launch as the symbolic achievement of the mission.

By the middle of the 1960s, NASA was completing the construction of new facilities on Merritt Island that would service the Apollo program and those that would follow. An informational booklet about these new facilities described them as the "engineering and construction efforts that will create America's first true Spaceport."[75] In order to accommodate the larger launch vehicles of the Apollo program, the agency needed not only a large parcel of land to act as an "exclusion zone" in the case of an explosion but also large-scale facilities that were without precedent. On the 88,000 acres of land that the government purchased or condemned in order to build the new spaceport, NASA constructed an industrial area that housed administrative and engineering activities, including checkout and assembly of vehicles, and a new launch complex on Merritt Island for Saturn launches. The booklet contained artists' renderings of the new facilities, including a modernist E-shaped headquarters building, an operations and checkout building featuring a high-bay with an enormous door, and the 525 foot tall Vehicle Assembly Building (VAB) in which the stages of Saturn rockets were assembled. Adjacent to the VAB was the Launch Control Center, with its reinforced firing room windows facing the launch area.

75 "Gateway to the Moon," n.nd., ca. 1965-1966. In the collection of the author.

in the early 1960s, KSC was also becoming the primary site for public engagement with the space program. Members of the public who could not visit KSC could still consume images of spaceflight on television and in newspapers and magazines. The scale of this image production is difficult to overstate. In 1965, in covering the joint mission of Gemini 6 and 7, the Public Affairs Office (PAO) at KSC reported spending over $61,000 on photographic operations, including shooting and processing nearly 150,000 feet of motion picture film, the majority of it in color.[76] According to the head of Public Affairs, "the amount of motion picture film consumed is literally staggering," even given that joint launch of Gemini 6 and 7 was a special circumstance.[77] By the end of the decade, human spaceflight had become an enormous media event. For the launch of Apollo 11, KSC reported granting media accreditation to a total of 3,497 broadcasters, journalists, photographers, and writers. By the time of the first lunar mission, PAO knew exactly what the public most wanted from the spectacle of a launch, so they specifically requested these images for film footage that would be used for public relations purposes.[78] The plan also identified 15 artists who had been invited to KSC to cover the launch, including famous postmodernist artist Robert Rauschenberg.[79] The images created at KSC would be distributed to media outlets all over the world, displayed in art galleries, broadcast on television, and later incorporated into a multitude of educational films and documentaries. And at the heart of this incredible visual output was the signature image of the rocket rising into the sky over the palmetto-dotted landscape of

76 Memo from Gordon Harris to Julian Scheer, January 14, 1966. KSC Files, 5476730, Box 4. NARA Atlanta.
77 Ibid., 2.
78 Apollo 11 Public Relations Plan, KSC Files, 4225121, Box 9. NARA Atlanta. P 24
79 Ibid., 28.

the Florida coast.

The image of KSC was co-created with the image of other centers and of the project of human spaceflight itself in the earliest years of the 1960s. It was in these years, when construction of new facilities was still underway and public interest in spaceflight had not yet reached Apollo-era highs that the meaning of NASA's centers was still in flux. The exchange of technologies and responsibilities between KSC and MSC in Houston was an important aspect of the formation of institutional identity and public image for both centers. In some ways, KSC only fully became America's Spaceport when MSC became the "nerve center" of the space program.

The Image of America's Spaceport

KSC's public image as America's Spaceport solidified through the 1960s, peaking in 1969 when all eyes turned toward the Cape to witness the launch of the first mission to the moon. But KSC had been a destination for tourists and space enthusiasts from the beginning. In late 1963, KSC started a program of self-guided driving tours of the site.[80] It was a moment of transition. The center had been renamed, from its initial designation as the Launch Operations Center, to honor of President John F. Kennedy only the prior month. Project Mercury had ended with its last mission in May of 1963, and Gemini launches had not yet begun. That winter was also when KSC's first director of Public Affairs, Gordon Harris, joined NASA. With new programs like the driving tours, visibility of the center would only increase, and major construction on new facilities such as the iconic Vehicle Assembly Building (VAB) would be complete within a few years,.

80 "Cape Opens for Sunday Drive-Thru." *Spaceport News* December 12, 1963.

By 1965, the center was becoming a significant attraction, especially during launches. The *Chicago Tribune* reported that in just a little over a year after KSC opened for public driving tours, nearly 400,000 people had visited the Spaceport.[81] The article described the route of the driving tour and detailed the facilities and exhibits on display at KSC, including the imposing VAB and the center's headquarters and astronaut facilities. Plans were already underway to build a Visitor Information Center and supplement self-guided driving tours with buses that would transport visitors around the launch complex. The bus tour program, which Trans World Airlines operated for KSC on contract, continued to expand in the 1960s, with the agency reporting some 515,000 visitors in 1967.[82] In 1972, the agency recorded a record-setting 1,389,042 visitors.[83]

For some observers, the experience of seeing KSC in person, especially for a launch, was the cure for the boredom that the space program often seemed to inspire. "So if you find yourself tuning out Walter Cronkite's moonshot TV coverage and humming 'The Thrill Is Gone,'" wrote a *Washington Post* reporter in 1971, "I've found the perfect stimulant. Visit the John F. Kennedy Space Center near the cities of Cape Canaveral and Titusville in Florida."[84] The writer argued that a visit to the space center might even change the perspective of those who thought that spending on the space program was wasteful and irrelevant.

81 "Cape kennedy Is Becoming a Major Tourist Draw," *Chicago Tribune* January 31, 1965.
82 "Increase of Visitors Recorded in NASA Tour Program," NASA News Release KSC-7-69, 1698.
83 "KSC Tour Operation Has Third Busiest Year," NASA News Release KSC-1-76, 1976.
84 Morris David Rosenberg, "A Look at the U.S. Space Program," *The Washington Post, Times Herald* December 5, 1971.

A long feature by Peter Blake in *Architectural Forum* magazine from a few years before had made a similar case for the ultimate value of the monumental engineering and building projects that characterized the image of KSC. In what had become a familiar refrain, the author proposed that the same expenditure of effort and expertise that created KSC could be turned on the social and infrastructural problems that critics believed were being neglected in favor of funding the space program:

> For the techniques developed by NASA for its particular mission may also be applicable to the sort of planning that is needed to deal with urgent problems here on earth. And the staggering achievements at Cape Kennedy and in related installations elsewhere suggest that this country is capable of similar achievements in the attack on urban problems — provided there is a clear objective, and a full commitment.[85]

Blake demonstrated that many seemingly far-out architectural concepts, such as walking cities and capsule-unit apartment buildings, were already being utilized by the space program in structures like the VAB and the mobile service structures used for Saturn rockets.

However, the engineering and building technologies on display in the space program were only one part of what Blake thought was valuable about the project. The management procedures and organization of NASA could, he argued, also be turned on "urban problems" such as housing. This idea of a "moonshot" planning policy would become popular in American politics in the late twentieth century and became shorthand for an all-out effort to achieve a single goal. But what impressed Blake enough to argue for this kind of policy was the monumentality and technological achievement of the Spaceport itself. As would the *Washington Post* writer some years

85 Peter Blake, "Cape Kennedy," *Architectural Forum* 126, no. 1 (1967): 50. (50-59)

later, Blake argued that the sublimity of space technology at the Cape could and should be enough to change people's minds about the political and social value of the space program. The technological capability to launch massive rockets to the moon would come to dominate the public image of KSC, but the process by which this image was formed relied on the entanglement of KSC with MSC in Texas. In the formative early years of the 1960s, the geography of these two centers was not yet settled, partly because they had not yet come to be exclusively identified with specific aspects of spaceflight. This changed in 1964 when Mission Control was moved from Florida to Texas.

Cape Control to Mission Control Houston

The (slightly misquoted) phrase "Houston, we have a problem" has become probably the second most famous line of dialogue from the great spectacle that was the space program of the 1960s (coming in behind Armstrong's first lunar words). But it actually marked a specific *part* of the space program. Mission control, specifically Mission Operations Control Room 2, is one of only two places at Johnson Space Center that has been designated as a National Historic Landmark. But calling home to "Houston" was something astronauts did not do until 1964, when two of the three human spaceflight programs that NASA oversaw in that era were almost complete. Instead, astronauts would radio back to "Cape Control" or "Cape" or "Cape CapCom" or another call sign that indicated they were speaking to mission controllers stationed in Florida, not Texas. Mission Control in Houston was an updated, improved version of Mercury Control at KSC, where ground operations for all project Mercury flights and one Gemini

flight had taken place. Because of the relative complexity of Gemini and Apollo flights, Mercury Control would need to undergo considerable upgrades, and mission controllers decided that there was inadequate space at the Cape to accommodate new technology and operations.[86]

From the perspective of KSC Public Affairs, the center was losing something important in this transfer, even as MSC was gaining a foundational part of its identity. This is, at least, the way that Harris, head of the KSC Public Affairs Office (PAO), seems to have conceptualized the move. He saw it as his responsibility to preserve KSC's institutional distinctiveness and its position of importance in the public understanding of space flight in the wake of the increased attention received by the Houston site after acquiring mission control.

Although Gemini 4, the first flight to be controlled from the new Mission Control in Houston, had only just been completed in June of 1965, there was no downtime for PAO at KSC. Only days after the mission, Harris sent a memo to the director of the center outlining what he saw as the fairly urgent problems facing Public Affairs for the upcoming launch of Gemini 5. The subject line read "KSC Identity." Whereas earlier missions had been launched and then subsequently controlled all from the Cape, from now on the duties of managing human space flights would be shared between KSC and the MSC. For Harris, this meant that the public image of human spaceflight in the United States, which had until this point been in large part controlled by his office, would also

86 Layne Karafantis, "Under Control: Constructing the Nerve Centers of the Cold War, (PhD Dissertation, Johns Hopkins University, 2016): 36.

be divided between the two centers. As spectacular as launches were to view in person at the Cape, Mission Control had stolen the show after only one flight. Harris wrote to KSC director Kurt Debus, “As a result of the transfer of mission control to MSC, Houston, the almost exclusive identification of MSC with the total Gemini 4 operation was achieved by the centralized dissemination of information. Practically all news stories and most television and radio programs carried the ‘Space Center, Houston’ dateline.”[87] In his memo to Debus, Harris cautioned that “it seems advisable to adjust our public affairs activities to enhance the image of the Kennedy Space Center in its proper role and context.”[88] A PAO staffer made a survey of local hotel owners in Cocoa Beach who reported a steep decline in the number of reporters booking hotel rooms for launches after the transfer. According to the hotel owners, reporters who were at Kennedy for launches were not staying the entire time, presumably splitting their time between the two centers now.[89] It was not that the activities at MSC and Mission Control were inherently more exciting than those at the cape. According to Harris, it was the centralization of information distribution at MSC that appealed most to the press, and which had caused a shift in the way the public understood the location of the space program.

According to files from his office, Harris was actively collecting information about how

87 Gordon Harris to Kurt Debus, KSC Director; Gemini 4 (1); Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
88 Ibid.
89 Gordon Harris to U. Wright Kerns, June 7, 1965; Gemini 4 (1); Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

the transfer had affected launch day attendance. In a background memo for the *Brevard Sentinel*, Harris outlined some of the amenities and benefits that Houston was offering VIPs who had attended the Gemini 4 launch. In addition to visits to the San Jacinto Monument and the River Oaks Country Club, VIPs in Houston enjoyed "trips to [the] Domed Stadium"; "special rooms" operated by airlines at the Houston airport; and yachting and fishing trips hosted by the Clear Lake Chamber of Commerce.[90] Harris' anxiety over the "proper role and context" of KSC and how it was presented to the public had not been assuaged by the end of 1965. In the midst of the joint Gemini 6/7 mission in December of that year, Harris wrote again to Debus to voice his concern about maintaining KSC's identity and public image. For example, he described the way that Jack King, longtime "Voice of the Cape" and broadcast commentator for NASA elided KSC in his coverage of the most recent countdown:

> [h]e told of the astronauts' sleep, of their breakfast, of their final physical check, all without mentioning where this happened; their transfer to the Pad 16 trailer, suiting up, transfer to the White Room, etc. At no time did he say Kennedy Space Center—all announcements are prefaced by the statement 'This is Gemini Launch Control…'[91]

Harris' specific concern about "where this happened" revealed something of his anxiety about maintaining a stable sense of place in PAO communications. Not satisfied with bringing this issue to Debus alone, Harris also wrote to King himself, with a somewhat testy question about whether the PAO was "party to some agreement which precludes

90 Gordon Harris to Taylor Briggs, Editor of the *Brevard Sentinel*, June 4, 1965; Gemini 4 (1); Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

91 Gordon Harris to Kurt Debus, December 14, 1965. Gemini 6/7; Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

mention of Kennedy Space Center during your broadcast commentary?"[92] Before Mission Control moved to Houston, KSC had been the public conduit for most of the information and images the public received about missions. It was, therefore, important to Harris that King and others be specific about which parts of the mission were KSC's responsibility in order to help solidify the center's identity and public image. Harris' concern that KSC would become solely associated with the launch of rockets and not with other aspects of human space missions proved to be justified as "Houston" came to be a shorthand for NASA's ground operations in general.

The Manned Spacecraft Center, Houston, Texas

One way that MSC's identity was especially distinct from KSC was in its integration and identification with the city of Houston. KSC, while it was still quite close to the smaller towns and cities of Brevard County, was twice as far away from the nearest large metropolitan area of Orlando than MSC was from Houston. Thus, the public image of KSC was dominated more by its spectacular technology and surrounding environment, while the changes that NASA's arrival brought to MSC had more impact on its image. The city of Houston was founded in the mid- nineteenth century by land speculators. In the first years of the twentieth century, the discovery of the Spindletop Oil field and the construction of the Houston Ship Channel fueled the nearly continuous growth of the city well into the postwar years. Houston was one of the largest cities in the American South in the 1960s, still growing and still commanding a sizeable portion of the nation's

92 Gordon Harris to Jack King, December 14, 1965. Gemini 6/7; Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

petroleum economy when NASA announced that it would move the Manned Spacecraft Center there in 1961. The land that NASA would use for its new installation was donated to the government by Rice University, which had previously received the 1000 acres as a gift from the Humble Oil Company.

In the 1960s, Houston was a sprawling low-rise metropolis, ringed by segregated suburbs. Initially, there was little development near the site of the proposed space center. The population of the Clear Lake area numbered a little over 6000, but it would expand to more than 45,000 by the end of the decade.[93] New suburban communities were developed, and older ones such as Seabrook that had been devastated by Hurricane Carla were revitalized by the influx of capital and middle-class families that came with NASA.[94]

Houston was considered typical of "Sun Belt" cities, a designation contained within a framework developed in urban studies in the 1970s and 80s.[95] Such cities were marked by a wave of economic growth that swept through the South in the postwar period as part of the expansion of the military industrial complex. Other scholars have identified a larger structure, the Gun Belt, which stretched from the West coast across the lower half of the country to Florida and up the coast of the Southeast.[96] Houston was typical of the political and economic character of conservative, laissez-faire capitalist cities located in

93 Kevin M. Brady, "NASA Launches Houston Into Orbit: The Economic and Social Impact of the Space Agency on Southeast Texas, 1961-1969," in Steven J. Dick and Roger Launius, eds., *Societal Impact of Spaceflight* (National Aeronautics and Space Administration, 2007): 452.
94 Ibid.
95 For a review of the place of "sunbelt" literature and a reevaluation of the suburban South in urban studies, see Matthew D. Lassiter and Kevin M. Kruse, "The Bulldozer Revolution: Suburbs and Southern History since World War II," *Journal of Southern History* LXXV, No. 3 (2009): 691-706.
96 Ann Markusen, Peter Hall, Scott Campbell and Sabina Deitrick, *The Rise of the Gunbelt: The Military Remapping of Industrial America.* (Oxford University Press, 1991).

these “belts.”[97] Without zoning and without a sufficient tax base to support major city planning, urban policy was largely directed by private business interests and managed through the Chamber of Commerce.[98] Neighborhoods looked after their own interests through deed restrictions and local civic organizing. While this approach worked well enough in meeting the needs of more affluent neighborhoods, it contributed to inequality in the city as a whole. The limited availability of public services hit poor neighborhoods particularly hard, especially black neighborhoods. So while the finished MSC opened to broad public acclaim in 1964, flanked by new middle-class neighborhoods housing its employees, it would be another year before some black neighborhoods in the north of the city received city sewer and water service.[99] While local business owners and city boosters enthusiastically greeted MSC and the influx of aerospace contractors, the radical changes and prosperity that they predicted for Houston on the heels of NASA’s arrival was, like all such futures, unevenly distributed.

When major construction was completed in 1964, MSC was a more than 1000-acre campus, composed of office space and technical facilities, located southeast of the Houston Metro area near Clear Lake, Texas. The site was nestled between the arms of the Clear and Mud lakes in Harris County. On the day the center was opened to the public in June of 1964, completed facilities consisted of a heating and cooling plant, a fire station, a thermo chemical test area, a garage for ground vehicle maintenance, an office building for logistics operations, shops and warehouses, a sewage treatment plant and a plant for water.[100] As of December 1964, MSC was responsible for the

97 Robert Fisher, “Urban Policy in Houston, Texas,” *Urban Studies* 26 (1989): 144.
98 Ibid., 147-148.
99 Ibid., 150.
100 “Additional Permanent Buildings Will Be Constructed To Complete the MSC Operational Complex,”

administration of the Gemini and Apollo programs. The operations of the center included mission planning; landing and recovery; flight support and control; spacecraft technology and crew systems; and the astronaut office. MSC, thus, came to be identified with administrative and command-and-control functions, whereas KSC's identity was profoundly shaped by its launch facilities. The identification of MSC with Mission Control was reflected in the use of "Houston" as the call sign that astronauts used to call home by radio during missions, but this close association between the city and the center was part of MSC's identity even before mission control came to Houston.

A NASA film from 1964 titled "The NASA Manned Spacecraft Center: A National Resource," opened not with images of spacecraft or astronauts in training but with footage of the downtown Houston skyline, its busy city streets, and cars driving on the Gulf Freeway.[101] Moving on to shots of Clear Lake, the film traced a visual history of MSC's construction by showing empty fields populated by cows; then a bulldozer; then the skeleton of a new building being erected, followed by more progress shots of the construction; and finally an image of a sign for NASA Road 1 and the Manned Spacecraft Center, next right. (Figure 2.3) The title card appeared over the finished site and the voiceover began with a description of the Mission Control Center, making it clear

that this was the most important function of MSC. The film defined the center as "...a

Space News Roundup (n.d. 1964).

101 "The NASA Manned Spacecraft Center: A National Resource," (National Aeronautics and Space Administration, MSC-64-242, 1964). This film is available online via the Texas Archive of the Moving Image: https://www.texasarchive.org/a_journey_to_the_moon/portfolio-item/the-nasa-manned-spacecraft-center-a-national-resource/ Last accessed January 31, 2019). The Archive doesn't give a date for the film, but the NASA identifier "MSC-64-242," if it follows NASA convention for naming photographs and files, indicates that the film was made in 1964.

great new national resource dedicated entirely to manned space missions. Located on 1620 acres on the edge of Clear Lake, the site was selected and the center was built to meet the needs of Manned Spaceflight Programs for the foreseeable future."[102] By 1954, MSC had become by a distinct place, bounded together by its own purposefully designed geography as opposed to the ad hoc spatiality of temporary facilities. It had its own mission and specialized facilities and staff, but it also conformed to familiar conventions of corporate architecture and planning. MSC also had the economic and social impacts expected of large-scale science and technology installations located in "Sunbelt" and "Gunbelt" cities. For the space program, MSC represented NASA's commitment to human spaceflight programs and its far-reaching vision. MSC was planned and built with the future in mind and with an expectation that human spaceflight would be achieved and remain a fixture of the United States government.

The Astrodome and the Creation of "Space City USA"

By the mid 1960s, MSC was a landmark in Houston, owing largely to its Mission Control function. A 1967 postcard showed a aerial view of the center, featuring an earlier photograph of one of its characteristic modernist office buildings under construction and framed by red scaffolding. The caption on the back deftly located MSC as a Houston landmark while nodding to the recent transformation of the city. It pointed out the most important feature of the center in

102 Ibid.

just two sentences: “Located about 25 miles south of Houston, Texas, the ‘Space Capital City’ of the United States. Here is located the Mission operations control room which tracks and controls the astronaut's flight.” Underscoring the interconnected meanings of the center and Houston’s new identity as the ‘Space Capital City,’ the card bore a watermark depicting the Astrodome and the name of company that made it, Astrocard.[103] (Figure 2.4) The Astrodome was completed the same year as MSC, and the new modernist stadium marked a moment of transition of the city’s identity from one aligned with the iconography of the “Wild West” and the frontier to one that fully embraced the space age that NASA brought to Houston.

A tourist brochure from 1973, at the earliest, showed how Houston had embraced the moniker and identity of “Space City - U.S.A.” and how the city had changed in the first decade since NASA’s arrival. (Figure 2.5) The brochure, sporting a photograph of the Sam Houston monument, proclaimed that the city was the “Home of Texas’ Independence[,] The Nation’s Astronauts[,] Nation’s 6th Largest City [and] Nation’s 3rd Largest Port.”[104] The brochure folded out into five panels with photos of Houston attractions splashed across the interior. Like the kitschy mixture of illustrations depicting cowboys and spaceships, the attractions advertised in the brochure also reflected this signature blending of Houston’s social and cultural institutions and identities. The Astrodome’s futuristic architecture was more than matched by the high modernist buildings housing the Museum of Fine Arts, the The Alley Theatre, and the Contemporary Arts Museum. But tourists were also encouraged to visit Sam Houston

103 “Discover Houston, Space City U.S.A.,” brochure, in the collection of the author.
104 Brochure “Discover Houston Space City - U.S.A.,” ND (circa 1973), in the collection of the author.

Park where the Harris County Heritage society had been working on a restoration that "reflects Houston as it existed in the early 1800s." The San Jacinto Battleground and the Old Market Square Park were also recommended. A speech bubble positioned near the spaceship-riding

cowboy read, “Plus there’s the Alabama Coushatta Indian Reservation to the North of us at Livingston.” The brochure’s selection of attractions, and especially the illustrations, portrayed Houston as a unique place, poised at the intersection between the old frontier and the new. The mythology of the Wild West, complete with an “Indian Reservation” imported to Houston from another city, contrasted with the image of a space age metropolis dotted with cutting edge scientific facilities and cultural institutions in angular concrete buildings and, as the cover notes, astronauts. The creation of the Astrodome and the impact it had on the image of Houston was another example of the 1960s transitional identity of the city to which NASA had more ties than just its space-aged name. The story of the Houston Astros and their magnificent domed stadium was also a story about the way that MSC and KSC were entangled in larger currents of mid-century American culture.

The Old Frontier and the New: The Astrodome and the Culture of Spaceflight

In 1960, a major league baseball team was finally coming to Houston. It was part of a huge city project that would include the construction of a new domed stadium, the first of its kind ever built. The project was spearheaded by Roy Hofheinz, a Texas politician and mayor of Houston from 1953 to 1955. Still invested in the growth and prestige of Houston, Hofheinz was involved in a number of development projects in the late 1950s before beginning the project of bringing a major league baseball team to the city and building a new stadium to house it.

The inspirational pedigree of the Astrodome project included none other than the domed

structures of R. Buckminster Fuller, a now famous figure in mid-century modernist design and futurist thinking.[105] In some ways, the Astrodome was a quintessential modernist project, intended to be "so big and luxurious it would change how people perceived the city."[106] Houston in the 1950s was regarded as a center for petroleum production, not as a city on the cutting edge or significantly invested in the futurist thinking that characterized the work of people like Fuller. While sprawling and growing, Houston was in some ways still a cow town. The Astrodome would help to change this, Hofheinz hoped, and this vision of a Houston of tomorrow was helped along by the arrival of NASA, nearly simultaneous with the groundbreaking for the new stadium.[107]

Both NASA and the new baseball team had to be operational in Houston before their new, modern facilities could be completed. The Astrodome would not be finished in time for baseball in 1962 when the team was slated to start playing. The team needed an interim stadium, which was built on a corner of what would become the Astrodome's parking lot. The team's name, the Colt 45s, and its wild west aesthetic, would also prove to be merely an interim condition. Like the construction of MSC's identity in the years spent in temporary facilities, the new image that the Astrodome promised to bring to Houston had to be negotiated with its longstanding wild west iconography.

The opening of the Astrodome marked for the city of Houston a similar moment to that of the opening of MSC for NASA. The Astrodome's high-tech appearance and

105 Robert C. Trumpbour and Kenneth Womack, *The Eighth Wonder of the World: The Life of Houston's Iconic Astrodome* (The University of Nebraska Press, 2016). Loc 306. I have used an e-book version of this book that doesn't have page numbers, and have instead specified "Location Numbers" for specific citations.
106 Ibid., loc. 298.
107 Ibid., loc. 318.

innovative architecture made for an extreme contrast with the campy ramshackle Colt Stadium. Benjamin Lisele argues that this contrast marks a distinct shift in the city's self image. He writes,

> Colt stadium in particular would offer a marked contrast to the Astrodome, for it too was a themed space—though it was outfitted in wild-western duds, a considerable contrast to the futurism of the Dome. The move from Colt Stadium to the Astrodome was thus an occasion to reflect on Houston's two versions of itself, caricatured as those were--the rough-and-tumble, no-holds-barred frontier cowboy and the space-age, progressive, modern, sophisticated entrepreneur.[108]

This same shift, from the wild west to the space age, is mirrored in the history of the image of the astronaut and in the representation of the larger institutional history of the American space program. Importantly, both of these representational shifts implicate place. For Houston, the transition from Colt Stadium to the Astrodome had marked a reevaluation of the city's identity and a commitment to a modernist, progressive vision for the future emblematized by new technology and scientific progress.

For some, the Astrodome was an even more important symbol of the new image of Houston than MSC.[109] Certainly the modernist but ultimately conservative architecture of MSC could not compete with the Astrodome. But the two built environments shared many of the same animating ideas, especially that technology represented progress and prosperity and a uniquely American way of life. And there was something of the technological sublime in *Life* magazine's coverage of the new stadium on the eve of its opening in 1965. Among the many wonders of luxury and fan experience that the new stadium provided, not to mention the baldly impressive fact of the stadium's more than

108 Benjamin Dylan Lisle, "'You've Got to Have Tangibles to Sell Intangibles': Ideologies of the Modern American Stadium, 1948-1982." PhD Dissertation, University of Texas at Austin, 2010. 262-263.
109 Sheila Wolfe, "Houston's Astrodome Catalyst for Progress," *Chicago Tribune*, March 25, 1971.

700-foot domed roof, perhaps the simplest of these was that baseball would be played indoors for the first time ever and often at night.[110] Fans could take in the sport, and later football and other events including rodeo, in air-conditioned comfort even in the punishing Texas summers. The Astrodome also invoked less tangible virtues of modernity: the use of public subsidies for its construction; notions of suburban spaciousness and mobility; conspicuous consumption; and importantly, contained, multi-purpose sites that incorporated a number of functions into one specially designed built environment.[111]

The Astrodome and MSC had even more in common in that both were inextricably linked to the east coast of Florida. The very same year that Mission Control was moved to Houston, spring training for the Colt 45s, soon to be renamed the Astros, was moved to Cocoa, Florida, a stone —- or a baseball's —- throw from KSC.[112] In addition, minor league farm teams for the Colts/Astros would also be located in Cocoa, including the Class A Cocoa Astros. A *New York Times* article about the opening of the Canaveral Causeway, a tollway between Cocoa on the Mainland and Cocoa Beach at the south end of Cape Canaveral, identified both the new "baseball layout" and the construction of new NASA facilities as part of "this rapidly expanding area."[113] Not only was traffic and congestion around the Cape sure to increase after the Astros moved their spring training to Cocoa in 1964, KSC's employee newspaper *Spaceport News* was printing the spring exhibition schedule for employees who wanted to take in a game at the

110 "Rain or Shine--Play Ball!," *Life* April 9, 1965. 88.
111 Lisle, "Ideologies of the Modern American Stadium," 7.
112 C. E. Wright, "On To Canaveral: Opening of New Causeway This Week Expected to Ease Flow of Traffic," *The New York Times*, October 6, 1963.
113 Ibid.

weekend in 1963.[114] And, like the Astros, important parts of MSC's operation took place in Florida. MSC's duties at the Cape included the final preparation of the spacecraft before launch and were housed in a building at KSC designated Hanger "S." For NASA, moving from the dispersed and ad hoc temporary facilities of the first iteration of MSC to the purpose-built facilities of what would become Johnson Space Center was the technological and organizational expression of the human space program's new political and cultural clout. In the case of MSC and the Astrodome, these social and cultural transitions were marked by the construction of new modernist buildings and the redesignation of large tracts of lands in suburban spaces. Both were part of a larger modernist project that sought to materialize the promises of postwar prosperity and futurist thinking through new architecture and facilities. MSC and KSC were fundamentally entangled in the early years of the 1960s, and the development of the public image of each center was in many ways dependent on that of the other in terms of their responsibilities for specific technologies and aspects of the space program; their cultural ties to other American institutions like baseball; and their roles as nodes in the large scale geographical structures of the military-industrial complex. The unifying theme of these interconnections is the part these centers played in a sweeping modernist faith in and enthusiasm for technology in the mid-century United States.

The Entangled Places of Spaceflight

The faith observers had in the social and political merits of large-scale technology projects was a hallmark of spaceflight enthusiasm in the 1960s and of a larger current of modernism in American culture in the postwar period. It manifested in the places of

114 "Full Slate of Baseball This Weekend," *Spaceport News* March 14, 1963.

spaceflight as modernist architecture, but it also manifested as an understanding of the space program as the apex of a progressive history of technological development. At KSC, spaceflight technology offered a model of technological problem solving that promised any goal could be achieved with focus and effort. At MSC, the technology of spaceflight and the economic and cultural benefits that accrued to Houston as its host had the power to transform the city from backward-looking cow town to "Space City U.S.A." But by the end of the 1960s, observers began to reevaluate the effects of the current of modernism that brought new places, including MSC and KSC, into being inside and in place of older places.

In 1972, the American Institute of Architects held its annual convention in Houston. The issue of the *AIA Journal* preceding the convention dedicated a large portion of its content to previewing the city and its architecture for AIA members. An "Outlook" piece informed readers that among the attractions would be "visits to the NASA Manned Spacecraft Center, a champagne citywide tour, a trip to the Bayou bend estate and a tour by the Harris County Heritage Society."[115] The magazine published an excerpt from the Houston AIA chapter's guide to the city, which addressed some of the history of Houston architecture and what the chapter saw as challenges for the future. The chapter cautioned that the city's rush into the future should not come at the expense of its past and that embracing newness threatened to erode the sense of place that defined Houston. The recent history of development in Houston had "contributed to the myth of the "Space City": rising edifices in the image of the evolving corporate state."[116]

115 "Outlook," *AIA Journal*, (April 1972): 8. An extensive run of the *AIA Journal* and other architectural magazines have been digitized by USModernist and are available for free online: http://www.usmodernist.org/library.htm. Last accessed February 26, 2019.
116 "Architecture in Houston: A Heritage and a Challenge," *AIA Journal* (April 1967): 20.

This corporate state, the article argued, remade the images of diverse towns and cities into homogenous copies across the country and resulted in a kind of generalized placelessness "where what was before is eclipsed by what is becoming…"[117] One page featured a series of photographs of historic buildings such as elaborate Victorian houses and the gothic facade of a building at the University of Texas. On the facing page was a collection of images of modernist buildings like the Astrodome, most of which had been constructed in the 1960s. The article contrasted these spreads: one represented the historic past and the other the "becoming" future as a caution against the potentially standardizing forces of modern architecture. In order to preserve meaning for the people who lived in cities, the piece argued, architects must preserve the roots and the particularity of those places. For the authors, the nickname "Space City" conjured up an ominously totalizing idea of modernism and growth, one that threatened the specialness of Houston rather than contributing to it.

This tension between what NASA's field installations represented at a large scale —– nodes in a continent-spanning network of spaceflight facilities and monuments to modernism and technological enthusiasm —– and their particularity as places with their own geography, work culture, and distinct surrounding communities and ways of life drove the creation of meaning about KSC and MSC in the 1960s. The chapters that follow analyze each center individually and focus on the specific senses in which these places were becoming distinctive and recognizable in the earliest years of the decade.

117 Ibid., 22.

3. “Loose in some real tropics”: Images of Nature, Technology, and Time at Kennedy Space Center

In 1968, the Public Affairs Office (PAO) at Kennedy Space Center (KSC) released an informational publication titled *The Kennedy Space Center Story* by Gordon Harris, KSC’s first Director of Public Affairs. Chapter One, “A National Resource,” opens with a description of the center that situated the Spaceport in the specific environmental and historical context of its location on the East Coast of Florida:

> Uniquely a creation of the Space Age, the Center presents sharp contrasts between its physical setting, early history and the gargantuan engineering achievements which transformed palmetto scrub, marshland and citrus groves into the first operational Spaceport. Archeologists found traces of human activity before the Christian era, Indian burial mounds and refuse piles of later times, and indications of French and Spanish explorations before the birth of the Republic. Professor Charles Fairbanks of the University of Florida observed that the site was one of the places where Western civilization came to the New World; now it is destined to become the place from which our civilization goes out to other worlds.[118]

Harris, like other observers, placed the American space program firmly within the long history of exploration and colonization in North America. But Harris took the extra step of situating KSC within the specific legacy of colonization in Florida. This passage echoed the familiar frontier narratives of spaceflight in the 1960s, and here Harris pinned these ideas to a specific place with a particular human history and natural environment. For Harris, KSC was a place that fit neatly into a progressive lineage of technology and the project of colonization and conquest.

118 Gordon L Harris, *The Kennedy Space Center Story* (The Kennedy Space Center, NASA, 1968, 32899): 1.

This image of KSC as the apex of technology and modern civilization, surrounded by an unlikely tropical landscape, was one that has endured well into the twenty-first century, in part because the landscape itself has endured. Protected under federal law as the Merritt Island National Wildlife Refuge, rockets still rise up through forests of palmetto and clouds of sea birds, though now with much less public attention and never bound for the moon (Figure 3.1).

These images of KSC and its surrounding landscape were developed in part by its PAO in the early years of the 1960s. But images of the environment and antiquity of the Spaceport were also widely circulated by journalists, writers, and public media. This chapter examines the construction of these images of the environment within the space program itself and in media. Nature has long been a part of the meaning of spaceflight, appearing in the form of the animating metaphor of the frontier that spaceflight boosters so often credited with the impetus for exploration. But in Florida, the space program's encounter with nature was much more immediate. Or, more precisely, representations of the space program's encounter with nature and with the human past of the area foregrounded the immediacy and importance of the environment that surrounded the Spaceport. These images were used to justify the new high-tech uses to which the land in the KSC area were being put and distorted time and the human history of the area to naturalize "America's Spaceport" as an inevitable and desirable use of a specific geographical place and environment.[119] The way that NASA and outside observers

119 The conventions of use for the names of various places were fairly fast and loose as far as journalists and observers were concerned in the 1960s. "The Cape" could mean anything from Cape Canaveral to Patrick Air Force Base, to Merritt Island. For the sake of clarity and brevity, I'll refer to the NASA site as the Spaceport or Kennedy Space Center, and to landforms as Cape Canaveral or the Cape, Merritt Island, and the mainland. See also "The 'Antiquity' of the Spaceport," below.

represented the environment and past of the area around the Spaceport contributed to space exploration being understood as the culmination of a progressive history of technological innovation and elided or excused the displacement of people that was required to create the image of a Spaceport set in a tropical wilderness. I close this chapter with a discussion of the establishment of the Merritt Island National Wildlife Refuge to show how all these representations, contribute to a flexible slate of meanings developed in the early 1960s about KSC in which the environment is central.

Encounters with Nature at America's Spaceport

Harris' image of KSC was created in the early years of the 1960s as part of a larger process of image formation in the space program. Harris' journalism background saw him serving prior to joining NASA as an intelligence officer in the Army and as a newspaper publisher as well as directing public information for the Army's rockets and space projects at the Redstone Arsenal. He joined NASA in 1963 as the first head of the PAO at KSC.[120] The first crewed launch event he oversaw was Gemini 3 in 1965. The "PAO Operations Plan" for the launch was written partly by Headquarters and partly by the KSC PAO office, and it contained plans and logistical information for personnel who would be staffing the event, escorting invited guests and VIPs, and working with the press. In the telephone directory at the end of the document, personnel were listed with descriptions of the subjects about which they could be consulted. Harris' entry indicated that he was prepared to answer questions about the "Visitor Program, Visitor Information Center, National Park Service participation, Merritt Island National Wildlife

120 "Gordon Harris," NASA, The Chroniclers: https://www.nasa.gov/centers/kennedy/about/history/chroniclers/harris-g.html (Last Accessed February 20, 2019).

Refuge, Indian Mounds, Public Access to MILA beaches, Labor Relations, KSC Mission, Operations, Budget."[121] Harris clearly understood the environment and deep past of the area around the center to be an integral part of its identity and a central part of his responsibility for creating a public image for KSC.

Kristen Starr has written a history of NASA Public Relations, focusing on the broader history of Public Relations within the agency, the Apollo 1 fire as a case study on the Kennedy Space Center PAO, and the Manned Spacecraft Center PAO during the Gemini program. Starr doesn't cover Public Affairs in the early years of human spaceflight at KSC.[122] These years were crucial for the formation of the environmental image of KSC, one rooted in Harris' understanding of both the benefits and challenges of locating a launch facility on a relatively undeveloped stretch of Florida coastline. I examine the ways that KSC PAO created an image of America's new Spaceport in which the landscape, and the acts of displacement that marked it, were central.

Scholars have created a framework for understanding the ways that ideas about nature and technology are distinctively intertwined in American culture.[123] Leo Marx's influential study of literary narratives about the environment and technology in the nineteenth century identifies the emergence of the trope of a technological interruption to a pastoral

121 PAO Operations Plan, Project Gemini, Gemini-Titan Mission 3," Public Affairs Office, John F. Kennedy Space Center, Florida, National Aeronautics and Space Administration, n.d. 1965: pp. 50; Gemini 3 (1); Public Information 1965-75, News Media Files, LH1 Incident Report, Foreign Relations, Gemini 3-5 PIO Files; News Media Files, 1965 - ca. 1975; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
122 Kristen Amanda Starr, "NASA's Hidden Power: NACA/NASA Public Relations and the Cold War, 1954-1967 (PhD Dissertation, Auburn University, 2008)
123 Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford University Press, 1964, 2000).

scene, which many observers used to describe the appearance of the high technology project of spaceflight taking place in the "wild" or "primitive" landscape of the Florida coast. This image of the intersection of nature and technology was used to signify a particularly American "feeling for nature," one that was developed in literature as a reaction to Industrialization. The specific image of the *rocket* promised to observers, and to NASA itself, a distinctively American image of technological progress, one that historian David Nye characterizes as an example of the technological sublime. In Nye's analysis, the technological sublime was a key representational practice in the formation of the image of American exceptionalism since the nation's founding. Where the specialness of the country had once been rooted in the extent and wildness of its land, industrialization brought new spectacles to which Americans could lay claim, ultimately among them spaceflight. Nye argues that the launch of a rocket for space exploration, rather than for carrying nuclear weapons, and the enthusiasm of the public for such spectacles "represents a nostalgic return to the technological sublime, a turning away from the abyss of the nuclear holocaust…"[124] I argue that a kind of nostalgia for empire also exists in the framing of the image of the rocket launch against its natural surroundings, where the launch is meant to symbolize the contrast of technological progress against the primitive landscape of the tropics.

In space history, analyses of the intersection of nature and spaceflight technology most often occurs as a mobilization or critique of the frontier metaphor that is so prevalent in both primary and secondary narratives about spaceflight in the 1960s. As Nye and others have argued, the frontier is the fundamental marker of technological meaning in

124 David E. Nye, *American Technological Sublime* (The MIT Press, 1996): 256.

the United States in the postwar period. From Vannevar Bush's "Endless Frontier" to John F. Kennedy's "New Frontier," the territorial expansion of the early frontier spirit had been replaced by the expansion of scientific and technological power.[125] Historian Howard McCurdy has argued that the space program was so often framed as a specifically American striving for a new frontier because "the frontier experience is thought to have shaped American culture in distinct ways, encouraging ingenuity, invention, innovation, equality, democracy, and material progress. Without a continuing frontier, from this point of view, these characteristics will disappear."[126] Having run out of frontiers on the surface of the earth, intrepid American pioneers in the postwar period would need to extend the frontier into outer space if they were to retain the social and political benefits they believed accrued to such explorers.

The frontier operates in the culture of spaceflight as a metaphor, albeit one with very real social and political uses. And although the objective that the frontier represents had by the 1960s changed in material terms, the spirit of exploration and conquest that animates the metaphor remained an important part of the image of human spaceflight, particularly at KSC. With their endless discussions of the heat, the uselessness of land covered by swamp or palmetto, and particularly the problem of mosquitoes, the environmental images of the land around KSC created by NASA and outside observers conform to many of the tropes that historian David Arnold has identified as part of the colonial construction of the tropics as primitive or backward landscapes, which are

125 David E. Nye, *Narratives and Spaces: Technology and the Construction of American Culture* (Columbia University Press, 1997): 147. For the ways in which this construction of the frontier is implicated in placemaking in *outer* space, see Lisa Messeri, *Placing Outer Space: An Earthly Ethnography of Other Worlds* (Duke University Press, 2016): 47.
126 Howard McCurdy, *Space and the American Imagination* (Johns Hopkins University Press, 1997,2011): 155.

contrasted with a “normal” temperate environment. I use Arnold’s formulation of *tropicality* to frame the images and discourses about nature at KSC in terms of the values historically assigned to tropical landscapes in colonial contexts. Tropicality can be thought of in this context as a particular register of the visuality of the space program, one that it shares with the visuality of empire. While Harris is explicit about the lineage of colonization in Florida when he writes about the history of the site, this lineage is far more often conveyed by specific conventions of representation that frame Cape Canaveral and the surrounding area as tropical. Arnold writes:

> Calling a part of the globe ‘the tropics’ (or by some equivalent term, such as the ‘equatorial region’ or ‘torrid zone’) became, over the centuries, a Western way of defining something culturally alien, as well as environmentally distinctive, from Europe (especially northern Europe) and other parts of the temperate zone. The tropics existed only in mental juxtaposition to something else—the perceived normality of the temperate lands. Tropicality was the experience of northern whites moving into an alien world—alien in climate, vegetation, people and disease.[127]

By framing the land around KSC as a tropical landscape, I show how the image of the center relies on the apparent contrast between technology and tropical nature, which is seen as primitive, backward, wild, and in need of the civilizing forces of large scale technology projects such as the space program. I also describe the way that the “emptying” of this tropical land was represented as natural, inevitable, and necessary for the landscape to achieve its full potential as both a high technology center and as a wildlife preserve.

The transformation of tropical landscapes into the modernist surrounds of high-

127 David Arnold, *The Problem of Nature: Environment, Culture and European Expansion*, (Wiley-Blackwell, 1996): 142-143. See also David Arnold, The Tropics and the Traveling Gaze: India, Landscape, and Science, 1800-1856, (University of Washington Press, 2015). See also Nancy Leys Stepan, *Picturing Tropical Nature* (Cornell University Press, 2001).

technology programs was not unique to the United States. Anthropologist Peter Redfield has considered the question of tropicality in relation to the history of spaceflight in French Guiana. The surface installations of space programs there are an explicitly colonial project, Redfield argues, to make a troublesome colony valuable. Located near the equator and along a coast facing open sea to the east, as does the Florida installation, Kourou became a desirable location for a Spaceport even as this same geography accounted in part for earlier failures by the French to develop the colony.[128] Redfield identifies an environmental narrative similar to those written about how KSC made the wild land of the Cape useful, noting that "...wilderness can have its uses, even for high technology. Or, more pointedly, space technology did not erase wilderness but found parts of it useful once it was properly redefined."[129] Redfield suggests that this particular redefinition of wilderness is at least in part specific to space technologies. He writes about a "...technological irony of rocketry: the more remote a location, the better suited it is for explosive experiments. Thus when seeking to leave the globe, wasteland becomes valuable and underdevelopment can appear a virtue. The same tropics that in the nineteenth century bore a sinister reputation for disease and disrepair beckon a key technology of the twentieth century."[130] As with the explicitly colonial project in Guiana, the technological redefinition of wilderness is central to the identity and meaning of the Florida site that would become the first American Spaceport.

128 Peter Redfield, "Beneath a Modern Sky: Space Technology and Its Place on the Ground," *Science, Technology and Human Values* 23, no. 3 (Summer, 1996): 260. See also Redfield, *Space in the Tropics*: *From Convicts to Rockets in French Guiana* (University of California Press, 2000).
129 Redfield, "Modern Sky," 261.
130 Redfield, "Modern Sky," 259.

In the United States, federal government's land use practices relied heavily on the representation of wilderness, and the creation of "emptiness" in such landscapes. Historian Mark David Spence has demonstrated how the creation of the most prominent National Parks in the United States relied on emptying the "wilderness" of indigenous people in the name of preserving the natural environment. National Parks, he argues, do not protect or delineate "remnants of a priori Nature," but "enshrine recently dispossessed landscapes."[131] When NASA and the federal government agreed in 1963 to create the Merritt Island National WIldlife Refuge, they transformed a landscape with a rich history of centuries of human life, recently emptied of its inhabitants, into a protected "wilderness." At KSC, residents of Merritt Island and the surrounding area were removed from the land that would become KSC, often by eminent domain. Furthermore, KSC's Public Relations Office and Visitor's Center created and used images of the antiquity of the Spaceport and the of the indigenous people who lived in the area until the nineteenth century to naturalize the presence of the Spaceport in the "wilderness" of the coast by situating KSC at the apex of technological progress.[132] In short, NASA and outside observers drew on the representational conventions of colonization to describe the environment around the Spaceport.

Additional meanings of nature in the space program were shaped in part by the nascent

131 Mark David Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks* (Oxford University Press, 2000): 5. On the role of the memory and representation of conflict with indigenous people in the larger culture of postwar America, see also Tom Engelhardt, *The End of Victory Culture: Cold War America and the Disillusioning of a Generation* (University of Massachusetts Press, 2007).

132 While the agency and the U.S. government more generally were of course engaged in projects that more explicitly fit the descriptor "colonial," particularly in the various island territories and holdings that the space program utilized for tracking stations, here I do want to be clear that I am not arguing that NASA colonized Florida, or that the space agency was engaged in any kind of colonial project on par with those which much of the literature on tropicality is about.

environmental movements of the 1960s and 1970s as Neil Maher has detailed in *Apollo in the Age of Aquarius*.[133] Maher argues that the agency, in responding to criticism from environmentalists in the 1970s, reframed the relationship between space technology and nature in terms of the particularity of Cape Canaveral. NASA's environmental consciousness matured along with the larger environmental movement and, thus, was not fully formed until a decade after the establishment of NASA facilities at the Cape. For example, the agency's agreement to create the Merritt Island National Wildlife Refuge in 1963 was motivated by the technological considerations of creating an exclusion zone around the launch area, rather than environmentalism.[134] Nevertheless, the agency in general and Harris in particular were aware of the representational value of the specific environment around KSC. This slightly earlier environmental understanding of the terrain, however, was connected more strongly to the frontier mythology that animated the culture of spaceflight than to later environmental activism.

My interpretation of the archival and representational sources on which this chapter is based traces the representation of the environment around KSC to show how these images were mobilized to imbue the new Spaceport with meaning about the place of spaceflight in the technological history of the United States. These representations, crucially, come both from inside NASA itself, largely generated by the PAO and from outside observers such as writers and journalists. One group of sources concerns lurid descriptions of the environment itself. Supplementing these are distortions of the temporality of the site, which change the way the deep past of the environment can be

133 Neil Maher, *Apollo in the Age of Aquarius* (Harvard University Press, 2017).
134 Ibid., 114.

implicated in its contemporary meanings. Related to this distortion are descriptions of the people who lived on the land that KSC now occupies, both in the center's recent past (the 1950s) and its deep past, as told through narratives about the archaeological sites on KSC property.

"Where the land that any sane man wants runs out": Images of Tropicality at KSC

Among the more widely read accounts of the environment around KSC were those written by outside observers, who were sent to document the momentous events taking place on the Florida coast. Author Norman Mailer in his account of the Apollo 11 mission in *Of A Fire on the Moon* introduced readers to the Spaceport area in explicit contrast to the more sterile confines of the Manned Spacecraft Center, which more closely resembled a suburban engineering campus than the tropical installation of the Spaceport.[135] To Mailer's mind, the Florida coast was much more suited to the underlying surreality of the space program precisely because the environment contrasted so sharply with the high-tech doings of KSC. Finally, "loose in some real tropics," he observed,

> It is country beaten by the wind and water, not dissimilar to Hatteras, Chincoteague and the National Seashore on Cape Cod, unspectacular country, uninhabited by men in normal times and normal occupations, for there are few trees and only occasional palms as ravaged and scabby as the matted backside of a monkey, a flat land of heat and water and birds [...] [I]t is country for hunting, for fishing, and for men who seek mosquitoes; it was next to uninhabited before the war. Now, first Spaceport—think on it! first *Spaceport*…[136]

Mailer thought it fitting that the absurdity of the space program was matched by the absurdity of building a Spaceport in such a place. Tom Wolfe, in his novelization of the

135 See Louise A. Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes*. (The MIT Press, 2014).
136 Norman Mailer, *Of a Fire on the Moon,* (Little, Brown and Company, 1970): 50.

history of Project Mercury, *The Right Stuff*, knew better. He observed that the land on which the Spaceport was built was the same kind of land as Edwards Air Force Base in the Mojave desert, where many of the first astronauts had come up as jet test pilots. Of the beach in Florida, Wolfe wrote,

> It was one of those bleached, sandy, bare-boned stretches where the land that any sane man wants runs out...and the government takes it over for the testing of hot and dangerous machines, and the kings of the resulting rat-shack kingdom are those who test them.[137]

In understanding that the land around the Cape was similar to other "empty" spaces that the government used for the building and testing of "hot and dangerous machines," Wolfe represented the Cape as a literal evolutionary backwater, describing it as "the sort of hopeless stone boondock spit where the vertebrates give up and the slugs and the No See'um bugs take over."[138] Wolfe also cast the landscape as primitive, prehistoric, backward, and at fundamental aesthetic odds with the high technology activity that was taking it over in the early 1960s.

The same imagery used by Mailer and Wolfe was also present in journalism about KSC. In 1964, *The New York Times* published an article titled "Visit to the Three Cape Kennedys" by Robert Whalen. The "Three Capes" that Whalen refers to are "the launch area, where the space story up to now has unfolded;" the new facilities that NASA was purpose-building for its own activities; and the community in the surrounding area. Whalen expressed some disbelief that activities like the construction of the world's largest building and the assembly and launch of rockets to the moon would take place in

137 Tom Wolfe, *The Right Stuff*, (Farrar, Straus and Giroux, 1979): 128.
138 Ibid.

"an improbable setting of sand, water and scrub growth."[139] Earlier that same year, another journalist described the construction projects on the site as "[t]he free world's greatest rocket center [...] rising rapidly on once-useless Florida swampland to support America's boldest adventure into space."[140]

These descriptions of the Cape posit that the area is empty —- of actual human life, or of what the writers consider valuable human activity —- and, thus, suited to being appropriated by NASA for its high tech purposes. These sites, however, were not innately empty; they had in fact *been emptied*. Writing about the United States' use of an empire of "networked" islands for such Cold War technology projects, Ruth Oldenziel observed that "[c]olonized, recently colonized, or tribal lands had become [in the post-war period] the Western powers' favored testing grounds for nuclear weapons and other controversial technologies." In these places, the United States engaged in a program of "'emptying out' spaces to fill them with 'pristine,' high-tech, prestigious," technologies.[141] This process invariably involved displacing the inhabitants, acts that received justification from environmental images that generated this conceptual emptiness.

A similar practice of emptying took place on the Florida coast when NASA arrived. In 1961, NASA announced that it would be acquiring 88,000 acres of land on Merritt Island to build new facilities, the most of which was a permanent launch operations

139 Robert G. Whalen, "Visit to Three Cape Kennedy's," *The New York Times*, December 13, 1964. See also Maher, *Apollo in the Age of Aquarius*, 97-103.
140 Al Rossiter, Jr., "Huge Spaceport Right on Schedule," *Chicago Tribune*, July 26, 1964.
141 Ruth Oldenziel, "Islands: The United States as a Networked Empire," in Gabrielle Hecht, ed., *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (The MIT Press, 2011): 22. Oldenziel's argument has important consequences for thinking about other NASA projects like the Manned Space Flight Network. See also Catherine Lutz, ed., *The Bases of Empire: The Global Struggle Against U.S. Military Posts* (New York University PRess, 2009).

installation.[142] In addition to the existing launch complex on the Cape and the new NASA installation to be built on Merritt island, the major part of the installation would actually be unused land. The size of moon rockets and their fuel capacity meant that any explosion or accident could be extremely dangerous. The land acquired would need to include a huge exclusion zone devoid of people and property that could be damaged in an accident. While some of the land for NASA's new Spaceport was purchased from individual landowners by the Army Corps of Engineers who managed the land acquisition, a good deal of it was acquired by condemnation. Even when the Corps successfully negotiated a sale, at least one family was forced to move multiple times as the scope of the land acquisition changed.[143] Harris, however, described this process in *The Kennedy Space Center Story* as an amicable arrangement between landowners and the government and failed to mention any condemnations. Harris is careful to address the aspects of community life that were displaced by NASA's arrival and provide explanations for how the agency was able to replace them or accomodate them. For example, Harris reported,

> Within the Federal reservation are 185,000 citrus trees planted on 3306 acres. The groves were leased back to their former owners by the Government. They care for the trees and harvest the annual crops of fruit. In return for this privilege, they pay annual lease fees to the U.S. Treasury.[144]

He noted that recreational areas are available for hunting and fishing and that Brevard County maintained a stretch of seashore for public use.[145] But Harris also reiterates that

142 Kenneth Lipartito and Orville R. Butler, *A History of the Kennedy Space Center* (University Press of Florida, 2007): 58.
143 William Barnaby Faherty, S.J., *Florida's Space Coast: The Impact of NASA on the Sunshine State* (University Press of Florida, 2002): 27.
144 Harris, *The Kennedy Space Center Story*, (The Kennedy Space Center, NASA, 1968, 32899): 6.
145 The development of the recreational potential of the area was an important policy focus for Brevard County in the 1960s, see David C. Weaver and James R. Anderson, "Some Aspects of Metropolitan Development in the Cape Kennedy Sphere of Influence," *Tijdschrift voor economische en sociale geografie*, May/June (1969): 187-192.

the land was mostly wild and listed the various animals and plants that could be found there. He closed the first chapter of his history with the familiar refrain: “This is the unique environment of almost virgin wild land contrasting sharply with Space Age facilities serving the needs of the national program today and in the future.”[146] Harris’ understanding of the area around KSC and his formulation of it as wilderness that was suited both to recreation and to high technology development was foundational for the larger meaning of KSC as a place in the public imagination. Harris’ reinterpretation of the environmental history of the site imbued it with meaning and potential that were convenient to NASA’s purposes. Both empty and full of life, self-contained yet conditionally open to the public, KSC and its surrounding area were fashioned by Harris as the ideal site for the space program. The contrast between the environment and NASA’s activities was for Harris a positive attribute of the site, pleasingly reminiscent of a colonial understanding of the tropics as resource-rich and malleable. This contrast was understood differently by other observers, who saw it as evidence of the absurdity of the project of human spaceflight, but it was still the most important vector for the creation of meaning about KSC.

The emptiness of the landscape of KSC, created by displacing the human residents in the area, was justified in part by images like those created by Mailer and Harris, which portrayed this area as wild, already sparsely populated, with an unpleasant climate and filled with disagreeable wildlife. Because the space was at once empty and useless, it constituted a desirable frontier in need of conquering. But the way the landscape looked to contemporary observes was only one part of the way it was represented. Images of

146 Ibid., 7.

the past were also enlisted by NASA and others to naturalize the presence of the space program in the wilderness of the Florida Coast.

The Atlantic Missile Range and the "Antiquity" of the Spaceport

The Spaceport was of course not the first government installation on the Cape, all talk of the barrenness of the area before NASA's arrival notwithstanding. It had been selected as a missile testing range in 1947, and the first launch took place in 1950.[147] NASA's formation in 1958 and its arrival at the Cape a few years later added a new set of names and designations to an already semantically crowded stretch of coastline.[148] The naming history of the Cape itself was more important, and it revealed the degree to which control over the environment of KSC, up to the renaming of its physical landforms in honor of a president's interest in spaceflight, was central to the larger cultural meaning of the center.

Cape Canaveral was so named by the Spanish for the cane reeds that covered the land. The area would certainly have had many other names before this, given to it by the Ais and other people who lived there before colonial contact. But on Thanksgiving Day in 1963, Lyndon Johnson declared that "Station No. 1 of the Atlantic Missile Range and the NASA Launch Operation Center in Florida shall hereafter be known as the John

147 Charles D. Benson and William Barnaby Faherty,"The Making of 'The Cape,'" *Moonport: A History of Apollo Launch Facilities* (National Aeronautics and Space Administration, NASA Special Publication-4204 in the NASA History Series, 1978). This volume is available in html online: https://www.hq.nasa.gov/pao/History/SP-4204/ch1-3.html.

148 The naming history of the Air Force and NASA installations at the Cape is complex, but not especially material to understanding the cultural history of the Spaceport. I found this table helpful for interpreting documents: "Organization and Installation Name History," Air Force Space and Missile Museum. Online: http://afspacemuseum.org/ccafs/namehistory/. (Last accessed March 28, 2019).

F. Kennedy Space Center," and he announced that he would change the name of Cape Canaveral to Cape Kennedy to honor the very recently assassinated president.[149]

The redesignation of government facilities in the name of presidents or other public figures was certainly nothing new, and, of course, Johnson himself would have a space center named for him a decade later. But renaming an entire landform was extraordinary, and the decision was controversial, particularly in Florida. In 1969, Floridians testified before a Senate committee in a hearing about changing the name back to Cape Canaveral on the grounds that the Cape was "'the oldest known and most continuously used landmark on the American Atlantic coast.'"[150] The Florida Legislature eventually changed the name back in 1974, the same year that the Manned Spacecraft Center in Houston was renamed the Lyndon B. Johnson Space Center.

The appeal by opponents to the antiquity of the Cape's name and the history it represented is one instance of how NASA was forced to reckon with the inherited meanings of the area's past as they sought to create new meanings about technology and the future for the Cape. One representational strategy, employed within and outside of NASA, was to compress the history of the Cape in such a way that its recent past became its antiquity, and the actual deep past became too distant to matter. One example of this compression of time is used by Whalen in the article "The Three Cape Kennedys" to set up the contrast between the Cape and the high-tech facilities NASA was building. He describes the various features of its "antiquity" that could still be

149 Quoted in Cabell Phillips, "Canaveral Space Center Renamed Cape Kennedy," *The New York Times* (November 29, 1963): 1-2.
150 Quoted in "Floridians Urge Cape Kennedy Be Renamed Cape Canaveral," *The New York Times* (November 25, 1969).

observed on the premises: “There are other vestiges of the Cape’s antiquity [...] Along the oceanfront are crumbling restaurants and cottages that vacationers once used; no one has bothered to take them down.”[151] The “crumbling” restaurants and cottages he described were in fact largely taken over by NASA when they were acquired with the land for the space center. The agency used many for storage, training, and contractor laboratories. Some would have been in use by the former residents and businesses of Merritt Island as recently as three years before Whalen’s piece was published. Appropriated buildings were marked with a NASA identification number — the buildings’ old meanings and uses neatly replaced by a little paint.

Mailer also employed the attribute of antiquity when writing about the space program. Mailer was covering the program for *Life* magazine, which originally serialized the story before it was published as a book. Like the magazine’s coverage of the astronauts, Mailer’s account was meant to bring the public into more intimate contact with the space program. His rich description of what he saw in Florida was part of his effort to explain the resonance — and dissonance — of the spaceflight effort with American history and contemporary culture. Of the very first launch structures used in the 1950s and early 60s, Mailer wrote,

> ...the early history of the Space Program is contained in these empty launch towers, now as isolated and private as grain elevators by the side of railroad tracks in the flat prairies of Nebraska, Kansa, and the Dakotas, the town low before them, the quiet whine of the wind like the sound of surf off a sea of wheat.

151 Joseph Hester, to Director of Administration, March 11, 1969; Ad Hoc Committee on Temporary Facilities January-March 1967; Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Directorate of Design Engineering, Real Estate Branch 1963-1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

> Here in the cricket-dinning tympani of Florida's dunes and marshes, the launching towers of rockets now obsolete give that same sense of the sentinel in a field of space, stand already as monoliths and artifacts of a prehistoric period when rockets usually exploded in the first few hundred feet of their flight.

Such accounts distorted the temporality of these places, shifting "antiquity" forward to mean just a decade or two in the past while the actual deep time of the Cape was rendered so distant as to be difficult to implicate in its present. The simplification that results in rendering the abstraction was similar to linear progressive narratives such as Harris' colonial timeline.

The "Natives of the Spaceport Area": Archeological Sites at KSC

In much the same way that these observers described the transformation of a wild and primitive landscape into an advanced technological installation, the deep human past of the area was enlisted to situate the Spaceport in a progressive linear history of which it is the technological, and civilizational, apex. *Spaceport News*, the internal newspaper of KSC, published a number of items about the archaeological sites on KSC property, which frame the actual antiquity in a similar way to the compressed antiquity that Whalen and Mailer described. A piece from 1968 began: "The first missiles—with chipped flint nosecones—were launched from the land now owned by KSC some 3000 years ago by primitive Indians."[152] (Figure 3.2) The writer connected the Spaceport to the deep time of the Cape and naturalized the presence of such a high tech endeavor in

152 "Counting Down with the Editor," *Spaceport News* (September 26, 1968): 8. An archive of *Spaceport News* issues is available in hard copy at the National Archives in Atlanta. The finding aid for these records indicates copies of the paper from 1966-1997 but I located issues from 1963 onward in the same record group. Spaceport News, 1966 - 1997; Office of Manned Space Flight, Public Affairs Office, ? - ?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration: National Archives and Records Administration-Southeast Region (Atlanta).

a wild landscape by placing the Spaceport in a progressive history of technology from the arrowhead to the rocket. In describing the period from 800 to 1000 A.D., the writer claimed that "[f]rom the Spaceport south was one of the few areas in the world where people maintained a fairly civilized standard of living…" Beyond this problematic construction of civilization, the framing suggested that the KSC had a history of innovation, into which the Spaceport rightly fit. Projecting the name "Spaceport" back into the description of the area's past made a claim on the land and time in this place. The writer referred "[t]he natives of the Spaceport area," the Ais people who descended from the people who made the middens and burial mounds that archaeologists were studying on the Spaceport site, as though they were the ones who had settled on NASA land, not the other way around.[153] The paper weaved a very short but brutal history of the Ais in which they "seemed to be particularly hostile to the Spanish" and remained so even after having been given money. By the eighteenth century though, according to *Spaceport News*, they had been exterminated by other native groups. Those that survived were supposedly protected by the Spanish.[154] Their pre-contact ancestors are described in archaeological terms, with descriptions of what they left behind paraphrased from an archaeological report about an excavation in 1963.

The subject of this report, a site called Ross Hammock, was brought to the attention of KSC Staff by the Florida Anthropological Society[155] (Figure 3.3) An archaeological report on the site, furnished to NASA and the National Park Service, documented the value of

153 Ibid.
154 Ibid.
155 Ripley P. Bullen, Adelaide K. Bullen and William J. Bryant, *Archaeological Investigations at the Ross Hammock Site, Florida* (The William J. Bryant Foundation, American Studies Report Number 7, 1967): 1. Available online: https://palmm.digital.flvc.org/islandora/object/ucf%3A15242#page/006/mode/2up. I'd like to thank Dr. Kathleen Sheppard for help with materials related to the archaeological history of this area.

the site and made recommendations for its preservation. Field work on the shore of the Intercoastal Waterway revealed “a complex of two very large sand burial mounds and a fairly extensive, but not extremely large, shell midden village area.”[156] Excavated objects included pot sherds, patterned with “check stamp” indentation; human bones including skulls; shell beads; vessels; and tools made from shells and stone. The report concluded that there was valuable data at the site and that it should be protected and studied.[157]

In *Spaceport News*, the archaeological sites near the Spaceport and the antiquity of the area were meant to be consumed by employees as an interesting feature of their workplace. Within the agency, however, the archaeological sites presented a challenge to NASA’s control of the land. In 1964, the Department of the Interior forwarded correspondence about the FAS’s interest in preserving the site to Harris, noting that “we have no idea as to whether the proposal of the Society to study and develop the site fits into your program of land use.”[158] The Ross Hammock site was located near the northern boundary of KSC on the mainland above Mosquito Lagoon. NASA’s facilities, then nearing completion, were clustered on Merritt Island and the Cape about 20 miles south. Thus, it was unlikely that NASA would need to utilize the site for anything other than as an exclusion zone, and to date has not, but NASA’s program of land use was firmly focused on the future. In response to the FAS’s campaign to preserve the site, the

156 Ibid., vii.
157 Ibid., 27.
158 Elbert Cox, Regional Director Department of the Interior to Clarence Bidgood, Director of Facilities Engineering, Kennedy Space Center, February 27, 1964; Directorate of Design Engineering, Real Estate Branch 1963-1970, Acquisition Status Reports 1962-1978, Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Real Property Management Files, ca. 1963-1970; Directorate of Design Engineering, Requirements and Resources Office, Real Estate Branch, 12/1963 – ca. 1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

agency drew up a set of restrictions that made it clear that while the site should be studied, NASA reserved all rights to the land for its own purposes. The logic behind these restrictions was clear: NASA and KSC were unsure about what resources would ultimately be needed for space programs in the future, so the right to develop or even build on land covered by research permits was essential to maintain. The restrictions called for NASA's right to "construct such roads, buildings or other facilities of a permanent or temporary nature, and perform other such work on or across lands within the area covered by the permit as KSC may from time to time determine to be necessary or desirable in the interest of the United States…"[159] This meant that NASA reserved the right to designate the site as an important archeological find in need of preservation or as a site for activities of national importance at the agency's own discretion. But NASA's interest in this location was not limited to what could be built there. The restrictions on the permit indicated that any items that had been recovered would be handed over to the Florida State Museum but only after they were made available to KSC for "temporary or permanent retention and public display in the Visitor Information Center or other repository at KSC."[160] The restrictions also called for periodic updates to be made to the PAO so that KSC could use that information for education and outreach. KSC also reserved the right to photograph the site and distribute images as it saw fit. This area was a resource for NASA in multiple ways for the multiple cultural and media products that could be extracted from the site.

159 Proposed Conditions and Restrictions to be Attached to National Park Service Permit to University of Florida for Archeological Survey, Excavation and Collection at KSC, April 18 1966. Directorate of Design Engineering, Real Estate Branch 1963-1970, Acquisition Status Reports 1962-1978, Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Real Property Management Files, ca. 1963-1970; Directorate of Design Engineering, Requirements and Resources Office, Real Estate Branch, 12/1963 – ca. 1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
160 Ibid.

NASA's control over sites like Ross Hammock allowed the agency to dictate the terms under which they were integrated into the public image of KSC and to create a narrative about the past that naturalized the presence of the new Spaceport within the tropical landscape. The archaeological sites were, like the endemic wildlife, presented as unique features of an already extraordinary place and ones that placed the space center in a lengthy imagined lineage of technological development.

"From Marshland to Spaceport": KSC as Tropical Workplace

The way in which archaeological sites were covered for the PAO publication *Spaceport News* was just one example of how it was responsible for both the public image of KSC and its internal self-image. The environmental images found in Spaceport News constructed KSC as a unique workplace where the peculiar environment of Florida's east coast was alternately a burden and a badge, something to be proud of and something to battle.

First published in December 1962, *Spaceport News* was to provide NASA employees with useful news and updates about work and life at the Cape. A short piece described the naming process for the newspaper, in which the PAO solicited suggestions from employees. That the paper's audience was already primed for the kinds of environmental meanings I have earlier detailed can be seen in the proposed name "NASA Space News Cape Canaveral, Florida, *Frontiersman*."[161] From its first issues, the paper framed the space center as a rare and unlikely technological installation in the

161 *Spaceport News* (December 13, 1962): 5. Emphasis mine.

midst of untamed nature. The sixth issue of *Spaceport News* contained a short humorous piece about a prank played on new employees that involved convincing them that the Cape lighthouse was actually a rocket with a very long countdown. The piece gave a brief history of the lighthouse that emphasized the contrast of a piece of technology and the surrounding landscape:

> The only features to break the total isolation of the present Cape area in 1868 were a few scattered houses on the north beach and a pier and old hotel on the south shore. Clouds of mosquitos [sic] and horseflies swarmed over an area inhabited mainly by snakes, scorpions and the occasional alligator which came waddling across from the Banana River.[162]

Later that month the paper interviewed Bob Gorman, a veteran of space and rocket programs, who talked to *Spaceport News* about what it was like working on the Cape before NASA began building the center. Gorman described a battle with an undeveloped landscape, saying that "[t]he only buildings on the Cape then were Central Control and a cafeteria'" and that "'[t]he mosquitos were so bad in those days everyone wore long sleeve shirts and gloves—even in the summer.'"[163] Mosquitoes and other wildlife were a frequent feature of descriptions of the environment at the Cape, particularly in representations of the past.

Another feature from that same spring returned to the nineteenth century history of the area, detailing the family history of a NASA employee whose family settled on the east coast of Florida in 1883. Mosquitoes featured heavily in remembered descriptions of the land and environment that older family members related to *Spaceport News*. "'We used to say,'" the employee's father recalled in the interview, "'that when mosquitoes were

162 "Cape's Old Lighthouse Has Yet to Go into Orbit," *Spaceport News* (February 7, 1963): 3.
163 "Veteran of 100+ Launches Recalls Early Cape Days," *Spaceport News* (February 28, 1963): 6.

out, you could strain a pint cup through the air and catch a quart of them.'"[164] Snakes too were apparently a memorable part of living in the area, according to the same interviewee, who confirmed that "[t]hey were all over the place! It's a wonder to me more people weren't bit. But nobody paid much attention to them."[165]

These environmental tropes were used to describe KSC well into the Apollo program. In 1968, an October issue of *Spaceport News* looked back on the preceding decade of spaceflight as the center prepared for the launch of Apollo 7, the first crewed Apollo launch. The issue included a condensed history of KSC titled "KSC Story—From Marshland to Spaceport."[166] (Figure 3.4) The language used to describe the environment of the Spaceport was very like that used by Harris in the similarly titled *The Kennedy Space Center Story* and might have in fact been written by him or compiled from his notes, evidence that Harris' understanding of the KSC environment was foundational for the agency's internal image building. The story opened with wild land rhetoric, proclaiming that "[w]hat is now KSC was virtually semi-wilderness when Pioneer I, the first U.S. deep space probe was launched from Cape Kennedy on October 11, 1958." This piece also contained the kind of temporal compression that the coverage of Ross Hammock employed, this time noting that "the former virgin lowlands adjacent to Cape Kennedy became the nation's first operational Spaceport."[167]

These temporal distortions were not just simple mismanagement of the chronology of events at the Cape; they were rhetorical devices used to draw a contrast between the

164 "NASA Girl's Family MILA Pioneers," *Spaceport News* (March 7, 1963): 1.
165 Ibid., 6.
166 "KSC Story—From Marshland to Spaceport," *Spaceport News* (October 10, 1968): 2-3.
167 Ibid., 2.

high technology activities of the Cape and the surrounding landscape. The very same issue featured a story about the early history of rocket launches from the Cape before NASA was even formed. It employed the same language to describe the area, stating that "[t]he Cape was still an untamed spit of land when the first Redstone missile cut a smoky trail through the sky on August 20, 1953."[168] The primitive, untamed, virgin past of the environment was not a fixed point in time but an infinitely mobile environmental condition that was conjured to heighten the sublimity of high-technology activities, particularly rocket launches.

Spaceport News also helped create environmental meanings for the center on a much smaller scale. For instance, the paper reported on the "gator-in-residence" at KSC in 1969, which was "one of two placed in the pond in front of the Headquarters Building by the U.S. Fish and Wildlife Service about a month ago as part of the program to restore its natural ecology."[169] (Figure 3.5) By running a contest to name the alligator and calling it Spaceport personnel's "unofficial pet," the paper mobilized the wildlife of the area in the formation of the image of the tropical Spaceport.

A curious piece from March 1969 detailed the landscaping projects undertaken around various buildings and facilities on the site. The piece was illustrated with a photograph of employee Gail Richards in front of the Visitor Information Center, and featured a characteristically pin-up style caption that read "Tropical Plants and Gail Richards [...] add beauty to the Visitors Information

168 Ibid., 4.
169 "Headquarters Pond Has 'Gator - You Name it and Win a Prize," *Spaceport News* (August 28, 1969): 3.

Center at KSC."[170] (Figure 3.6) The writer detailed some of the native plants that were used to decorate the Spaceport, noting that

> [t]o the northern newcomer, they may appear to be just some more of the kookie Florida vegetation but they're plants that have been proven for the area and can be recommended for home landscaping projects. For that's where many of them stood originally—around the private homes dotted around the property bought by NASA for KSC.[171]

The knowing aside about "northern newcomers" helped create a sense of unity for KSC employees that was explicitly about living and working in what was perceived as a unique or "kookie" environment. That many of the actual plants used in the landscaping were displaced from property purchased in the land acquisition was a strangely poignant contrast to Harris' breezy description of that process in *The Kennedy Space Center Story*. The *Spaceport News* piece gave more detail about the physical processes of acquiring these properties and their plants than most accounts of land acquisition either from the 1960s or later historical accounts: "They were gently dug out of their former homes and moved to a holding area off the Kennedy Parkway and held for use in such projects as the VIC [Visitor Information Center], saving much in landscaping expense." The image was, I think, a fitting one to convey the totalizing displacement of the agency's land acquisition, which was both physical and, as I have argued, aesthetic and rhetorical. That the plants were then placed in front of the Visitor Information Center, the central hub for public access to the Spaceport, was another useful image for thinking about the way that the environment was implicated in the meaning-making practices of the PAO in the 1960s.

170 "Native Plants, Imports Add Beauty," *Spaceport News* (March 27, 1969): 8
171 Ibid.

The Rocket in the Wilderness

In 1963, with the first phase of land acquisition complete and construction well underway, NASA executed an agreement with the U.S. Fish and Wildlife Service to redesignate all of the "empty" land around the Spaceport—most of which formed the protective exclusion zone—as a wildlife refuge.[172] This redesignation ensured that the "wilderness" around the center could not be further developed and would, therefore, remain an integral part of the identity of KSC. It was also a tidy solution for NASA that maintained the emptiness it needed as an exclusion zone, but conveniently "filled" that emptiness with now-desirable wildlife and undeveloped, "pristine" wilderness in need of preservation. The land acquisition process had created some friction, and questions about the necessity of such a large exclusion zone could also be easily put to bed by the creation of the new refuge. The "useless swamp" and "boondock spit" was now a national treasure.

The redesignation of the land as a wildlife reserve was also another kind of temporal compression. The land was at once undeveloped and under federal protection, wild while simultaneously managed. It provided NASA and other observers with a flexible slate of meanings that could be turned and tweaked to make the Spaceport seem both inevitable and desirable as well as pleasingly incongruous with its surrounding environment. A space shuttle-era (n.d. Circa 1981) edition of Harris' *The Kennedy Space Center Story* demonstrated how durable the environmental identity of the Spaceport turned out to be. The new introduction to the volume began with a

172 For a legal history of the refuge system in the United States, which is distinct from the National Parks system, see Robert L. Fischman, "The National Wildlife Refuge System and the Hallmarks of Modern Organic Legislation," *Ecology Law Quarterly* 29, no. 3 (September, 2002): 458-622.

description of KSC that suggests that the Spaceport represented a favorable fusion of nature and technology:

> Located on the east coast of Florida approximately midway between Jacksonville and Miami, the 56,700 hectares (140,000 acres) controlled by the Center represent a melding of technology and nature. Wildlife thrives here, alongside the immense steel-and-concrete structures of the nation's major launch base. KSC is a national wildlife refuge, and part of its coastal area is a national seashore by agreement between the National Aeronautics and Space Administration and the Department of the Interior. Over 200 species of birds live here year-round, and in the colder months large flocks of migratory waterfowl arrive from the North and stay for the winter. Many species of endangered wildlife are native to this area; the Southern bald eagle, dusky seaside sparrow, brown pelican, manatee, peregrine falcon, green sea turtle, and Kemp's Ridley sea turtle.[173]

In this description, KSC was not merely co-extensive with the Merritt Island National Wildlife Refuge; "KSC is a national wildlife refuge." The identification of the center with the surrounding environment was complete in this description, and this was further emphasized by the illustrations. The cover of this edition featured a full-bleed photo of a space shuttle launch, foregrounded by a stretch of water, some thick vegetation, and a cloud of birds taking off against plumes of smoke and steam that shroud the base of the launch tower. (Figure 3.7) The first page of the introduction is illustrated by a photograph of a bald eagle, with the Vehicle Assembly Building in the background. That multiple editions of *The Kennedy Space Center Story*, despite being extensively rewritten to keep pace with the changing nature of the space program, contained similar environmental narratives was evidence that the peculiar natural environment surrounding the Spaceport was a significant part of the image and of the cultural meaning of Spaceflight in America.

173 *The Kennedy Space Center Story* (National Aeronautics and Space Administration, n.d., ca. 1981): 1.

The expansion of the American space program created and codified different forms of "emptiness" to naturalize and justify its use of land. Playing up the contrast between the high-technology activities of NASA and the "primitive" environment surrounding, KSC was

representational strategy that was incorporated into the Spaceport's identity by its own PAO, and taken up by influential observers whose accounts were widely read. NASA's use of land in Florida generated meanings about spaceflight that were connected not to some larger cosmic purpose but to the very tangible, earthly concerns of the environment, resources, people's homes, and modes and legacies of colonization and displacement.

4. Temporary Facilities and Interim Places: Creating the Manned Spacecraft Center

The early years of the 1960s were an important moment of transition and consolidation of vision for NASA in general and for the Manned Spacecraft Center (MSC) in Houston in particular. Borrowed storefronts in the Gulfgate Shopping City were the center's first outpost in the city. Until 1961, human spaceflight operations had been managed by the Space Task Group, located at Langley Air Force Base in Virginia. Only a few months after President John F. Kennedy's speech to Congress about a United States' commitment to landing on the moon and with the promise of substantial appropriations for such a project, NASA began an intensive period of expansion and building. The new facilities constructed during this time would come to symbolize a political and cultural commitment to human spaceflight. The short presidential timeline for a moon landing project meant that NASA had to maintain its essential functions even as it was aggressively expanding geographically. Thus, it was under pressure that the Space Task Group was redesignated as the Manned Spacecraft Center and the operation moved to Houston several years before the majority of permanent facilities were completed in 1964.

This interim period in the history of MSC was marked by various placemaking practices enacted by NASA and by observers in Houston to construct a functioning center with a coherent institutional identity and surrounding community within a network of temporary facilities. NASA employees relied on images and tools for visualization, provided both

by NASA and available in the larger cultural context of the 1960s, to imagine what work and home life would ultimately be like at MSC. As mostly white, middle-class professionals, MSC employees could anticipate that their work life would reflect the familiar structures of the managerial capitalism that had come to dominate corporate and governmental organizations in the twentieth century that had been explored in popular sociological accounts since the 1950s. But they were also aided in their visualization by observers in Houston who reacted to the announcement of MSC's new location with predictions about the changes that NASA would bring to the city. In addition, NASA itself was actively involved in the creation and provision of images and tools for visualization, such as a guide for buying homes and reassuring speeches about the environment in Texas, that helped employees to construct a sense of what life would be like when they made the move to Houston.

As NASA began rapidly expanding its operations in 1961, the agency faced the increasingly challenging prospect of managing what was becoming a large, diffuse organization. The mission of human spaceflight, which accounted in the early 1960s for most of NASA's budget and attention, required numerous field installations, specialized facilities, and a wide range of technical and managerial expertise. With the construction of entirely new field installations including MSC, the management of human spaceflight necessitated the creation of new management techniques and organization styles. But like other large-scale scientific or technical projects, both private and government funded, NASA relied on the prevailing norms of white collar work culture to organize its new centers. The way centers would be managed created distinct work cultures that

contributed to a larger sense of place where centers were located.

These images and prescriptive visualization tools contributed to a sense of the place MSC was becoming. They incorporated not only the stratified, bureaucratic workplace that was emblematized in concept drawings of MSC's eventual campus but also an image of the suburban home life that middle-class, professional "organization men" had come to expect for themselves in the postwar period. The visuality of MSC in the years before its permanent facilities were complete relied on images of a familiar future inflected by mainstream cultural currents of American work and family life.

Organization Culture in Spaceflight

In the years after World War II, sociologists had begun theorizing the particular conditions of middle class professional life in the United States. The image of the "Organization Man" outlined in the 1950s offered a model of professional work life that resonated deeply with the generations coming of age after the war. William H. Whyte's study of the culture of large organizations, including corporations and government scientific and technical projects, proposed a new avatar for white collar professional workers in the United States.[174] Subsumed into large scale organizations and consumed by what he called the "social ethic" of these organizations, the "Organization Man" consigned himself to working within a vague middle-management sector within a bureaucratized hierarchy in which he submitted to the organization's demand for loyalty and commitment to its goals. Like the large aerospace and defense corporations that

174 William H. Whyte, *The Organization Man* (Simon & Schuster, 1956). See also C. Wright Mills, *White Collar: The American Middle Classes* (Oxford University Press, 1951).

NASA contracted with, the agency itself was an example of such an organization. The space program substituted corporate goals of profit and expansion with the ideological goals of its Cold War contest with the Soviet Union. However, it engendered and demanded a similar loyalty and commitment from its workers, and its organizational culture would have been familiar to any seasoned Organization Man.

Whyte also considered the way that home life in suburban communities reflected the values of the Organization Man. In *The Organization Man*, he argued that it was transience, the act of leaving home and then seeking to reclaim or replace those roots in the suburbs, that most defined the communities of organization people.[175] This mobility was then mirrored by corporate policies of transferring employees to different locations, which made it difficult to settle in.[176] The space program demanded the same of its employees. Workers making the move from Langley to Houston would have to search for and create new communities there, but like the organization itself, they had a sturdy model of what suburban middle class life should look like. Whyte characterized the suburbs, or "package communities," as communal living spaces where simple neighborliness was transcended by the values of "belongingness" and "togetherness" that the organization instilled in employees.[177] In the communities around MSC, this lifestyle was represented by the nickname "Togethersville." Furthermore, in the transitional years during the move to Houston, NASA provided employees with tools to visualize this new life, which helped them model this kind of home and work life on an individual scale.

175 Ibid., 276.
176 Ibid., 275.
177 Ibid., 286.

The management history of NASA has been actively recorded since the 1960s, and has been given a great deal of attention by historians of spaceflight.[178] Historian Henry Dethloff's study details the management practices at MSC, especially in the formative years before permanent facilities were occupied in 1964. According to Dethloff, "[n]ot only did things get done, but a very important management system or style that became referred [sic] to later as the 'Gilruth system' became implanted in the organization and the culture of the developing space center."[179] The project of human spaceflight required innovation in a myriad of scientific and technical fields as well as in integrating these fields into one seamless operation that could meet President Kennedy's deadline for a lunar landing by the end of the 1960s. Even the basics of managing money and procuring materials for such a project were without much useful precedent.[180] Dethloff, like many of the managers he interviews, gives Robert Gilruth, the first director of MSC, a great deal of credit for inventing its management system. Gilruth's style was well aligned with Whyte's earlier characterization of the Organization Man, in that "those who worked with him [Gilruth] were 'associates'—just that—not employees or underlings," and as a result, "MSC at its best represented a collegial association of engineers gathered together almost fortuitously to complete a task…"[181] To Whyte, the manager who viewed his employees as "associates" rather than "underlings" was one who refused to acknowledge his position of leadership and authority as a problem with

178 Robert L Rosholt, *An Administrative History of NASA, 1958-1963* (National Aeronautics and Space Administration, 1966). This and other NASA management histories are available online through the NASA History Office: https://history.nasa.gov/series95.html (Last accessed February 28, 2019).
179 Henry C. Dethloff, *Suddenly, Tomorrow Came...A History of the Johnson Space Center* (National Aeronautics and Space Administration, 1993): loc. 1556 (Kindle Edition).
180 Ibid., loc. 1618.
181 Ibid, loc. 1663.

modern organizations. The focus on group work, as opposed to individual contribution, was for Whyte an indication that the organization did not value individuality. Dethloff, however, looks favorably on Gilruth's leadership of MSC in these early years. While Whyte would have been suspicious of Dethloff's characterization of the intrepid climate at MSC in these early years, Dethloff writes "[f]ew years have been so demanding of human energy effort, and simple endurance."[182] This framing is suggestive of a culture of absolute commitment, in this case to a national goal. In this chapter, I show how this ethos of hard work in the expression of national will was reflected in images of work and home life in Houston that NASA employees and managers used to visualize MSC, even as it was being built in the early years of the 1960s.

Recently scholars have given more attention to the cultural dynamics of the management of NASA. Matthew Hersch has explored how astronauts, the iconic heroes of the space program, fit into the professional culture of spaceflight not as reckless maverick pilots but as highly educated and skilled systems managers.[183] But the astronauts were only the most visible workers within NASA's large-scale operations. Historian Matthew Tribbe has analyzed the culture of NASA against the countercultural movements of the 1960s, positing a sharp distinction between the staid, "square" culture of bureaucracy at the agency that seemed to contrast dramatically with the cosmic aesthetics of psychedelia.[184] For some observers, the ideological imperative of the space program was not simply to assert the superiority of Western technology and anti-communism but to oppose what some saw as the cultural rot at the heart of

182 Ibid., 1556.
183 Matthew H. Hersch, *Inventing the American Astronaut* (Palgrave Macmillan, 2012).
184 Tribbe, Matthew D. *No Requiem for the Space Age: The Apollo Moon Landings and American Culture*. (Oxford University Press, 2014).

countercultural movements such as anti-war activism and rock and roll.[185] For space program advocates, the cautious, technocratic approach to spaceflight was a virtue of American science and engineering culture — a triumph of the Organization Man over the threat posed by hippies and dropouts.

Environmental historian Neil Maher has similarly analyzed the connections between the space program and the most important social movements of the 1960s by considering the cultural ramifications of NASA's style of organization and work. In his chapter on the emergence of the New Right, he couches the history of the creation of MSC within a larger analysis of the spread of conservative, white middle-class suburban communities. In planning and building permanent facilities for MSC, NASA emulated the mid-century corporate embrace of nature as a symbol of power by creating a precisely landscaped suburban campus.[186] Maher draws on landscape architect Louise Mozing's study of suburban corporate architecture, which describes the deployment of the pastoral ideal in corporate landscape architecture as a way to make corporations palatable to the public and to attract high quality employees.[187] The suburban corporate campus, an entity that had appeared in the 1940s as large corporations relocated from urban areas to bucolic suburbs, served as the model for what MSC should become in the early years when it occupied temporary facilities while the center was under construction.[188] Mozingo argues that by building research and development facilities and corporate

185 Ibid., 135-136.
186 Neil Maher, *Apollo in the Age of Aquarius* (Harvard University Press, 2017): 212-215.
187 Louise A. Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (The MIT Press, 2011). See also Reinhold Martin, *The Organizational Complex: Architecture, Media, and Corporate Space* (The MIT Press, 2003). On corporate mid century aesthetics and design see John Harwood, *The Interface: IBM and the Transformation of Corporate Design, 1945-1976* (University of Minnesota Press, 2016).
188 Ibid., 21-25.

headquarters in suburban areas and by including well-designed landscaping that mimicked pastoral scenery, corporations could soothe some of the public's skepticism about their growing power and influence in American life.[189] Maher further connects this type of planning and the suburban neighborhoods that grew up around MSC, which accommodated its mostly middle-class, white employees, to the suburban grassroots of the New Right.[190]

Moreover, the Cold War politics of NASA's mission fit well with the notion that the corporate campus represented a symbolic investment in the virtues of American capitalism. As they grew in power and influence in the postwar period, corporations, Mozingo writes,

> allied themselves with the images and, by implication, values of an idealized, if not quite real, America: the edifying civility of bucolic small towns, technological modernity in service to life enhancing progress, and the nuclear family ensconced in material comfort. Like suburban homeowners, corporations understood the capacity of pastoral surround to communicate identity, status, and right-mindedness, acute concerns to enterprises exercising new power in the twentieth century.[191]

These same values of right-mindedness, hard work, and technological progress underpinned NASA's "square" management style and were reflected in the built environments of MSC and the communities that grew up around it in the early 1960s. The suburban corporate campus and the communities that would grow up around it were images that the planning and construction of MSC aspired to, and these images helped shape the new center to fit the ideal of the totalizing organization situated on geographically bounded, landscaped grounds outside the city. This chapter describes

189 Ibid., 11.
190 Maher, *Apollo in the Age of Aquarius,* 220-224.
191 Mozingo, *Pastoral Capitalism*, 41-43.

these processes of visualization as well as the tools and practices that enabled them as MSC employees envisioned and planned for their new work and home lives in Houston.

Imagining NASA in Houston

Observers in Houston began visualizing the new Manned Spacecraft Center and the changes it would bring to the city immediately after NASA announced the selection of the site in 1961. Houston newspapers were filled with celebratory coverage of the announcement and lofty predictions about how MSC's presence would forever change the city and the region. Bringing the space program to Texas promised to put Houston on the map, which is what *The Houston Press* did with a diagram of the city's new place in the universe. In the center of a column-width box, an enormous Earth is marked with a dot labeled "HOUSTON" to which an arrow pointing at the moon is attached. The Earth is flanked on the other side by the sun, making Houston the center of this little cosmos. Because the arrow zips straight from the city to the moon, it is also the center of the project of spaceflight itself.[192] (Figure 4.1)

The *Houston Chronicle* celebrated the fact that the city would soon be "Home for 7 Astronauts," and with the short piece, it printed headshots of each astronaut, all wearing sharp suit jackets and ties and buzz-cuts. The papers touted the importance of Rice University in securing the decision to build the lab in Houston and the gift of the land initially made by the Humble Oil Company. To help readers visualize a sleek new campus on the mostly open land, *The Houston Press* provided aerial photographs of

192 Richard Boyce, "1000-Acre Rice U Trace in E. Harris Site of Giant Project," *The Houston Press* September 19, 1961. The newspaper articles in this section were accessed at the archives of the Neumann Library At the University of Houston, Clear Lake. They come from the Organization Series in the Johnson Space Center History Files, Box 10.

where the site would be built, which showed a network of roads, a few trees, and a couple of buildings set against a broad open plain.[193] A second image, taken at much closer range, depicted "a huge, two-story Italian style mansion [...] located adjacent to a 1000-acre site accepted by NASA as the home of the Manned-Flight Space Center…"[194] The article reported that this grand old house, once home of James Marion West, was being offered to the agency as headquarters for its new facilities.[195] The next day another piece in the *Press* clarified through a Rice spokesperson that "it is not definite that the building will be used for the space laboratory's temporary headquarters but it may be," and the spokesperson further specified that "the building itself will be no part of the permanent space laboratory installation."[196] Thus, the existing structures at the site, and in Houston generally, would serve well enough as temporary facilities for NASA, but MSC's permanent facilities would be the apex of the changes that came to Houston with the space program.

In the same piece, readers were also promised that the new facility would alter the intellectual geography of the southeastern United States and that NASA's coming heralded a revolution not only for Houston but for the whole gulf region. Ralph Yarborough, the Democratic senator from Texas, "called the choice of the Houston area 'the great coming of the scientific age to the Gulf Coast,'" and he added that the high concentration of scientists who would be working in the area meant that Houston should expect a "'great wave of intellectual activity around the rim of the Gulf of Mexico [...]

193 "Where the Space Lab Will Be," *The Houston Press*, September 20, 1961. 6.
194 Ibid.
195 Note this?
196 Margaret Davis, "Space Lab May Be in Renaissance Setting," *The Houston Press*, September 21, 1961.

rivaling that which swept the Greek world around the rim of the Mediterranean Sea more than 20 centuries ago…'"[197] Similarly, the editorial page of the *Houston Post* proclaimed a "New Era in Science and Progress" for the area.[198] Other observers were slightly more circumspect; they contained their expectations for radical change to the greater Houston area at most and believed that the scientific age had arrived sometime before NASA. The newly appointed president of Rice University, Kenneth Pitzer, said to the *Houston Press* that "[t]he presence of this laboratory will symbolize the magnitude and vigor of the entire scientific and technical community centered in Houston."[199] A *Houston Chronicle* article published a few days later was more explicit on this point by insisting that "[r]esearch projects in Houston's educational and medical institutions already are geared to the problems of flight into space."[200] In a few days, *The Houston Press* had moved on from surprise and elation at NASA's announcement to implying and then insisting that the city had been prepared and waiting for this all along. If Houston had perhaps seemed an unlikely choice for the space program, observers advocated for its fitness in public and extolled the benefits that NASA's presence would bring. Houston was transformed into Space City U.S.A, the cradle of spaceflight technology and the rightful heir to all that Western science had to offer in a matter of days.

Newspapers sought to explain to the people of the Houston area exactly what functions MSC would carry out that other centers would not, and to quash any visions that people

197 Ibid.
198 "Space Center Here Means New Era In Science and Progress for Area," *The Houston Post*, September 20, 1961, 2.
199 "Pitzer Hails Space Lab: 'Symbolic of Houston,'" *The Houston Press*, September 21, 1961. 23.
200 Moselle Boland, "Projects Here Are Geared To Space Flight," *The Houston Chronicle*, September 24, 1961.

might have of rockets rising over the Texas plains. *The Houston Press* reported that static testing of Saturn rockets might happen in Houston but specified that the actual launches would occur at Cape Canaveral.[201] The next day the paper ran a long piece with details about the new facilities and management in which it called the facilities "the command center for the moon landing mission" according to NASA Administrator James Webb.[202] The formation of MSC's identity as the nerve center of the American space program and its distinction from the more visible aspects of spaceflight such as rocket launches had begun immediately. Readers were, thus, encouraged to imagine MSC more like a government laboratory or a corporate campus — and ultimately a combination of both — than a spaceport. Often referred to in these articles as a command center or command post, *The Houston Chronicle* also called it a "spacious, self-contained research city," which suggested the form that the center would ultimately take as a closed research campus.[203] While the image of what MSC would become seemed fairly stable in the press coverage of the announcement, it would not become a reality for a few more years, and within NASA, there seemed to be some doubt about the merits of the choice of Houston.

While public coverage of the decision to locate MSC in Houston was overall quite positive, Robert Gilruth, the first director of MSC, had some persistent worries about the site selection, even a month after it was made public. In a memo to Webb, Gilruth detailed the problems he saw with the site. Gilruth was concerned, for instance, "that [if Humble Oil dug the new ship channel and turning basin they proposed] oil refineries,

201 Richard H. Boyce, "Actual Shot Would Be At Canaveral," *The Houston Press*, September 20, 1960.
202 Felton West, "Start on Apollo Lab Indefinite," *The Houston Post*, September 21, 1961.
203 "Annual Payroll Of $17 Million; 800 Families," *The Houston Chronicle* [date illegible].

petro-chemical plants and other obnoxious heavy industry would be the type most likely to locate in such an area. This kind of neighbor is not the type which would be desirable for our laboratory complex."[204] He also wanted to make sure that there would be sufficient land available in the event that the center needed to expand to meet the needs of future space programs. Although the site was in line with post-war development norms that encouraged corporate campuses to build in the suburbs, the proposed location in Clear Lake, about twenty miles outside of Houston, was simply too far out in the sticks for Gilruth. "The most desirable housing in the Houston area is in the Southwest and Northwest," he wrote, suggesting that the one-hour commute risked NASA "losing the advantages of locating near a metropolitan complex."[205] Gilruth would ultimately be proven wrong about the availability of desirable housing near the site as development was already underway on the suburban communities, such as Clear Lake City and Seabrook, that would grow up around the site.

Gilruth's perception of Houston was also likely influenced by the condition in which he found the region upon his arrival there in September 1961, not long after Hurricane Carla made landfall on the Gulf coast. Carla had been a Category 5 storm, and Gilruth and the rest of the advance party were greeted by flooded fields, debris strewn highways, and boats stranded on land.[206] But not all of the potentially negative images of Houston that Gilruth had conjured became realities. The community of Seabrook had been hit especially hard by Carla, and its reconstruction in the 1960s was due in part to

204 Robert Gilruth to James Webb, October 16, 1961. MSC Site Selection Correspondence 1958-1962; Box 10: MSC Site Selection; Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).
205 Ibid.
206 Dethloff, *Suddenly Tomorrow Came*, loc. 1308.

the infusion of money and people that came with MSC.[207] These communities were shaped by NASA employees and contractors who moved to Houston in the years following the announcement to rent homes and apartments and to build their dream houses. The character of these communities — close-knit, insular, conservative, white and relatively affluent — reflected the larger work culture that MSC was developing as it constructed an identity for itself ahead of the completion of its suburban campus.

Temporary Facilities of the Manned Spacecraft Center 1961-1964

Regardless of Gilruth's misgivings about Houston, he was still obligated to begin transferring MSC operations to Texas immediately, a process that began with the leasing of temporary facilities. NASA's first outpost in Houston was two storefronts in the Gulfgate Shopping City, donated and furnished by local business owners.[208] In October, the Assistant Director for Facilities at Headquarters circulated a briefing memo about the leasing program for new facilities that specified MSC would need about 250,000 square feet of space "to avoid a split operation between Houston and Langley; and to accommodate the STG pending construction of the administrative and laboratory facilities authorized and appropriated in fiscal year 1962."[209] While permanent facilities would not be complete for a few more years, NASA intended to migrate all MSC operations to Houston as soon as possible. They anticipated prodigious growth in the number of personnel stationed in Texas over that time. Staff at the site increased from

207 Kevin M. Bradley, "NASA Launches Houston Into Orbit: The Economic and Social Impact of the Space Agency on Southeast Texas, 1961-1969," in Steven J. Dick and Roger Launius, eds., *Societal Impact of Spaceflight* (National Aeronautics and Space Administration, 2007): 453.
208 Dethloff, *Suddenly Tomorrow Came*, Loc. 1424.
209 Briefing Memo from Assistant Director for Facilities, NASA Headquarters, October 5, 1961; Lease of Temporary Facilities; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).

17 at the time leasing began in the late autumn of 1961 to 2400 by the summer of 1963.[210] The leased facilities would be used for offices, workshops, and laboratories.

In the memo outlining his plan for leasing facilities, Gilruth advised that the process be started immediately, which was partly because "[m]ost of the space available for rent is in a construction phase and desirable modifications can still be made in the construction plans." The renovations the agency made to these buildings, many of which are still standing, were perhaps its most invisible marks on the city. They have been preserved in the archive as large staple-bound booklets of work orders that note in detail every change made: when, how, and at what cost. Some changes, of course, were not permanent, such as the "temporary installation of a Govt. owned water cooler."[211] NASA's purposes were specialized enough that even for its temporary sites some degree of purpose-built customization was necessary to accommodate operations until permanent facilities could be built.

The initial complex of leased buildings spanned a wedge-shaped area of about 10 square miles that followed the western edge of the Gulf Freeway south to just above the airport. (Figure 4.2) The agency published a booklet sometime after the summer of 1962 as a guide to employees arriving in the area. The inside cover relayed the brief history of MSC to date and describe the temporary situation as it stood ahead of the completion of construction:

210 Manned Spacecraft Center to NASA Headquarters Office of the Associate Administrator, November 22, 1961; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).
211 List of work orders for temporary buildings, pp 7; Lease of Temporary Facilities; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).

> [...] The move of 751 NASA employees and their families from Langley Air Force Base to Houston was completed July 1 [1962]. The permanent site at Clear Lake is now under construction and is scheduled for completion about the end of 1963. During the interim period, Manned Spacecraft Center's Operations in this area are being housed in 11 different sites in Houston and additional space at Ellington Air Force Base.[212]

The booklet included photographs of the temporary sites. While MSC's permanent facilities were designed as a coherent campus with modernist architecture and landscaping, the temporary facilities were located in all kinds of buildings that were not connected to one another by anything but their general location in Houston and NASA's tenancy. Even though renovations may have been extensive in some buildings, others were just filled with office furniture, and a sign bearing the name "Manned Spacecraft Center" and the NASA "meatball" logo was hung up somewhere facing the street. The guide, with its detailed map and directions to each building printed beneath its photograph, was a necessary wayfinding tool for employees as well as a document of the placemaking practices of renovation and signage that the agency employed to create the Manned Spacecraft *Center* from a collection of temporary, repurposed buildings.

The image of the future MSC was already in circulation even as NASA set up operations in temporary facilities. In the back of the booklet was a concept image of "Clear Lake—Site No. 1 (Eventual Home of Manned Spacecraft Center)," which depicted a wide, multi-story office building in a spacious landscaped setting with silhouetted images of trees composited over the scene. A similar concept drawing,

212 "Manned Spacecraft Center Has Moved To...Houston!!," Printed booklet, n.d. ca 1962; Lease of Temporary Facilities; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).

which was made for press distribution in 1962, featured a wider angle on the proposed campus that showed the same multi-story building flanked by a series of lower buildings.[213] (Figure 4.3) In this image, the landscape of the center was hazy and indistinct, dotted with out-of-scale, impossibly tall trees with crowns of gauzy, immaterial leaves. The placemaking practices of NASA in these interim years, extended into the future in imagining, creating, and distributing images of what would become the permanent place of MSC in the earliest days of the organization.

Organizational Identity: Management at MSC

While operating in temporary facilities, MSC continued to build its organizational identity in the early years of the 1960s. One way that the agency helped along this process of identity formation was with an employee newspaper. Like *Spaceport News*, which would appear two years later at the Launch Operations Center/Kennedy Space Center (KSC), *Space News Roundup* was established soon after the announcement of the new designation and facilities. Its first issue, published in November 1961, bore the name "Manned Spacecraft Center, Langley AFB, VA." The front page of the new newspaper featured a photograph of Langley from the air, placed opposite an image of wide freeway lanes leading to downtown Houston. The headline read "STG Renamed; WIll MOVE: Manned Spacecraft Center to Have Texas Home."[214] Like local newspapers in Houston, *Roundup* was a venue in which people could visualize what MSC would become. In its pages, employees could not only see visual images of Houston and MSC's facilities, they were also exposed to an image of the organizational culture that

213 NASA Photo No. 62-MSC-6, in the collection of the author.
214 *Space News Roundup* November 1, 1961. 1.

was being formed in the early years of MSC. *Roundup* provided employees with tools to create two distinct but deeply interrelated places in Houston. The first was an efficient, productive organization dedicated to the goal of human spaceflight, and the second was a home in Texas for employees and their families that aligned with their expectations as mostly white, mostly middle-class professionals.

In 1961, the first priority in forming the new center was to begin moving employees to Houston to establish operations, especially purchasing and personnel operations. The bulk of the workforce would make the move in 1962, but first, some needed convincing and the necessary tools to visualize life in Houston. For example, in that first issue, an article described the resources available at a newly-established Relocation Information Center staffed by Shirley Hatley of the Public Affairs Office, which provided information about the move and about Houston. Hatley had on hand copies of Houston newspapers with classifieds sections and a wide variety of other materials:

> Houston phone book yellow pages; the August and September issues of the *Houston Magazine* [...]; an industrial facts book of League City, Tex.; a booklet and magazine of facts concerning Pearland, Tex. [...]; and leaflets concerning the facilities offered by the 1,800 Holcomb Boulevard Apartments, Frostwood Housing Development, YMCA--East End, and the Holiday Park for Mobile Homes, Pasadena, Tex.[215]

Other items included leaflets with titles like “Houston’s Magic Circle,” “Facts About Houston — World Gateway for the Exciting Southwest,” and “Welcome to Houston.”[216] The paper encouraged employees to avail themselves of the office and of Hatley herself, whose phone number was provided. Hatley had a counterpart in Houston

215 “Relocation Information Center Operating in Building T-107,” *Spaceport News* November 1, 1961. 2.
216 Ibid.

named Grace Winn, whose job was to help facilitate the move to Houston. Upon being recruited to the job by the agency, "Grace recalled that she had no idea what NASA was, but that [Texas Congressman Olin] 'Tiger' Teague said that since she knew the city and had been a part of it for a long time, she should go and introduce these people to Houston."[217] From a newly leased office building in Houston, Winn welcomed many MSC employees to Houston and even met them at the airport. She provided information about housing and schools, the weather, doctors and dentists, and leisure and recreation as well as "books about local insects and snakes for the wary new arrivals."[218] This last was something a number of employees seemed to need reassurance about. John Powers, a Mercury Public Affairs officer, apparently had to convince people at Langley that there weren't actually "hundreds of snakes [which] crawled around the streets" of Houston.[219] Ralph Sawyer, an engineer at NASA in the 1960s, remembered that while the final decision was being made his wife hoped that the Space Task Group would not move to *Florida* "because she thought it was snakes and sand and this sort of thing."[220] These anecdotes suggest something of the anxiety that employees may have been feeling about the move and underscore the importance of NASA providing resources like Hately and Winn — and publicizing them in *Roundup* — to help employees accurately visualize their new life in Texas.

In the first two issues of *Roundup*, the editors covered speeches that Gilruth made to

217 Dethloff, *Suddenly Tomorrow Came*, loc. 1370.
218 Ibid., loc. 1398.
219 Ibid., loc. 1364.
220 Sawyer, Ralph S., "NASA Johnson Space Center Oral History Project," Interview by Kevin M. Rusnak, October 7, 1999. Online: https://historycollection.jsc.nasa.gov/JSCHistoryPortal/history/oral_histories/SawyerRS/SawyerRS_10-7-99.htm (Last Accessed May 4, 2019).

various professional societies about the role and responsibilities of MSC as a way to clarify the same for employees. To the American Rocket Society, Gilruth spoke about the Project Mercury goals that were close to completion and of the future of human spaceflight.[221] Gilruth cited among the important accomplishments of the first few years of human spaceflight "[t]he development and expansion of a solid management capability for the conduct of manned space flight research activity" in addition to the development of new technologies and the selection of astronauts. For Gilruth, the space program found itself in the midst of the move to Houston and the construction of new facilities in a moment when "[m]anned exploration is coming of age." To the Sigma Delta Chi convention, a meeting of professional journalists, Gilruth repeated these achievements, beginning again with management, and identified some of the problems the agency would face in the Apollo era.[222] Such challenges, many technological, could be met by "[t]he development [and] implementation of a dynamic management team," and an increased focus on national research and development and "[t]he development and expression of national will." [223] Although the two speeches were probably largely the same, *Roundup* reporting on both helped to solidify Gilruth's message to his employees. Effective management would be key to the space program going forward but so was understanding the project of spaceflight as an articulation of the will of the nation. This framing underscored that the organization to which employees were expected to dedicate their labor and expertise was the United States itself. Gilruth, in explaining what the organization had learned from its experience so far, argued that "if the public—the real stockholders in this great national corporation—understand these things—we

221 "Gilruth Speaks at ARS Meeting" *Space News Roundup* November 1, 1961. 1.
222 "Gilruth Speaks to Journalists About Space Responsibilities," *Space News Roundup* November 15, 1961. 8.
223 Ibid., 3.

cannot fail." By casting the nation as a corporation and specifying that the space program and MSC in particular were charged with expressing the will of the nation/corporation, Gilruth made it clear not only that MSC should be run like a business but that it was patriotic to do so.

In *The Organization Man*, Whyte argued that a sense of belonging was something that the organization offered the organization man, and in return, the organization demanded his loyalty and his dedication. For Whyte, "Togetherness," was a corollary to "Belongingness," both of which refer to the tendency for teams and group work to be recognized or valued more than individuals within organizations. Whyte called this a kind of false collectivisation in which people were lumped together in groups or teams that did not actually describe their true relationships or account for their individual contributions. Whyte rejected the generalization that team work of this kind necessarily promotes creativity.[224]

Images of "Belongingness" and testimony to its virtues were visible in many places in *Roundup*. The paper printed a 1961 missive from Webb, then NASA Administrator, asking employees to help with the recruiting effort to staff MSC. First, Webb framed the project of spaceflight as "the assignment" that the entire organization of NASA had been given by the nation. "Each one of you is needed to assist in recruiting qualified personnel to complete this assignment," Webb wrote, "[w]hatever your field of work." Webb added that he hoped each employee would "consider the building of the NASA

224 Whyte, *The Organization Man*, 51.

staff as a personal responsibility."[225] As an administrator, Webb helped to establish an organizational culture in which the group effort toward national goals was a central feature of work life within the agency. In the same issue, a joint holiday greeting from Webb, High Dryden, and Robert Seamans thanked employees for "[t]he dedicated and tireless response to this task by every member of NASA."[226] At least in these early images of MSC's work culture, belonging to an important national imperative and contributing one's dedication and hard work to the effort were main messages Gilruth and Webb had for employees.

In addition to these messages about the work culture of MSC, *Roundup* also published management charts that helped employees to visualize the structure of MSC and to enact belongingness within a complex operation. In part because the center was growing so fast and, thus, becoming more complex and stratified in the early years of the decade, these charts were useful visual aids for employees to understand the changing hierarchy at MSC. In November of 1963, for instance, *Roundup* reported on the recent reorganization of MSC to reassign Project Mercury personnel to Gemini and Apollo teams. The paper included a full-page organizational chart in addition to a narrative piece explaining the changes.[227] (Figure 4.4) The next issue featured an even larger chart that included much more detail and more photographs of the heads of program offices.[228]

225 "Webb Asks Aid In Recruitment," *Space News Roundup* December 27, 1961. 7.
226 "Seasons Greetings," *Space News Roundup* December 271, 1961. 8.
227 "MSC Structural Reorganization To Strengthen Space Programs," *Space News Roundup* November 13, 1963.
228 "Manned Spacecraft Center Organization Chart," *Space News Roundup* November 27, 1963.

In 1962, as the number of personnel in Houston increased sharply and NASA began leasing temporary facilities and ramping up spaceflight operations, Gilruth and his lieutenants had to put his managerial vision for MSC into practice. In January, *Roundup* looked forward to the year ahead with special attention to the challenges of working in temporary facilities, noting that "although our activities may appear to be more decentralized for a time, careful thought has been given to ensure that this move and its accompanying problems will in no way deter the overall goal."[229] Similarly, guidelines issued by Gilruth about the move from Langley to Houston insisted that "no part of the move would be permitted to interfere with the Mercury program."[230] *Roundup* was an important site for employees to visualize the nascent MSC as it was coming into being and to receive images of purpose, solidarity, and belongingness directly from management within a large-scale organization. In addition to the employee newspaper, NASA provided other tools for employees to imagine their home lives in Houston.

A Vision of Home in Houston

The suburbs surrounding MSC were only partially constructed when MSC employees began moving to Houston and looking for places to live. For those who could afford it, moving to Houston might mean the opportunity to build. Others purchased existing homes or rented houses or apartments. In November of 1961, *Roundup* polled Langley employees, who planned to move to Houston, about their housing preferences. The resulting data was reported in an issue of the newspaper and provided an image of the home life that NASA employees imagined for themselves in Texas. Fifty percent of

229 "Editorial," *Space News Roundup* December 10, 1962. 6.
230 "Move to Houston Is On Schedule," *Space News Roundup* January 10, 1962. 1.

respondents who imagined themselves living in apartments reported that they preferred living 20-30 minutes from the space center, more than the 32 percent who imagined a shorter commute of only 10-20 minutes. Interestingly, a majority of apartment dwellers wanted something temporary, perhaps reflecting the transience that Whyte described as a hallmark of organization life.[231] For those who wanted to buy houses, the numbers were nearly the same. Most potential homebuyers saw themselves spending between $16,000 and $19,000, and the overwhelming majority wanted new homes. The paper even broke down the results according to construction, noting that 98 percent wanted brick over frame, and eighty percent preferred ranch-style homes.

In 1963, the largest salary group at NASA made between $8,831 and $17,557 per year, and pay generally lined up with the government's General Schedule Salary rates, which ranged from $3776 at the low end of GS1 to a little over $27,000 for GS18.[232] According to census data from that year, this meant that the approximately 40 percent of NASA employees making over $8,000 per year was roughly the same percentage of families in that income bracket in the United States overall.[233] Thus, most NASA employees were solidly middle class, and many could afford to buy new homes in Houston, even if not all could build dream homes.

231 "Housing Questionnaire Gives Answers to Houston Needs," *Space News Roundup* November 29, 1961. 8.
232 Van Nummen, Jane and. Bruno, Leonard C with Rover L. Rosholt. "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration. NASA SP-4012 (1976): 65.
233"Income of Families and Persons in the United States: 1963. (U.S. Department of Commerce, Current-Population Reports, Consumer Income, Series p-60, No. 43. September 29, 1964.): 1. Available from the Census website: https://www2.census.gov/prod2/popscan/p60-043.pdf (Last accessed March 3, 2019.)

NASA provided a guide for home buyers that included a "Home Buyer's Check List" created by the Southwest Research Institute of San Antonio. The guide included a glossary of terms; information on how to calculate mortgage payments and where to get one; a checklist for calculating monthly costs; and the checklist for evaluating a home for sale.[234] This checklist was a rating system with values assigned to individual items, such that a "theoretically perfect house" would score 1000 points.[235] Just as the majority of moving employees indicated a preference for ranch-style homes, the checklist specified that "in the interest of making it useful to the greatest number of people the check list has been confined to the items that are most often found in houses today. There are no questions, for example, on basements or stairs."[236] This concern with newness and the current trends in domestic architecture was mirrored in the checklist, with one question indicating that the buyer should score zero if the house appeared to "imitate some style of the past such as Cape Cod, Georgian, Spanish, etc."[237]

The other values on the checklist are often deeply subjective and simultaneously prescriptive. In particular, the question "[a]re the people you see the kind you would like to have as neighbors?" carried some unpleasant implications about how the prospective homebuyer should judge the neighbors upon merely *seeing* them.[238] Houston suburbs in the 1960s were sharply segregated, and most NASA employees were white. The communities in which they purchased and rented reflected these racial divisions, and

234 Home Purchase Guide, National Aeronautics and Space Administration/ Southwest Research Institute of San Antonio, Texas. N.d.; Space Task Group Move From Langley 1961-62; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).
235 Ibid., 13.
236 Ibid., 14.
237 Ibid., 18.
238 Ibid., 16.

tools like the checklist likely contributed to these racialized images of “ideal” home life. Another prompt instructed the buyer to score zero if “houses have large picture windows facing the street” because it indicated that “privacy has been disregarded” by the builder.[239] This concern for picture windows is repeated on a following page along with a more general question about the house being “reasonably private from the street and from neighbors.”[240]

The checklist was explicitly not intended to cover the financial circumstances and class expectations of every prospective homebuyer, and, thus, it would be disingenuous to claim, for instance, that the presence of a “service entrance” on the checklist meant that everyone using it was wealthy. But it is instructive to pay attention to the possibilities for home life that such a list suggested and to note again that the list was provided to MSC employees by the center itself. The processes of making MSC and of making a home in Houston, both complex sets of placemaking practices, were interdependent and interconnected in ways that embodied certain mid-century social and cultural norms that were at play in the work and home lives of NASA personnel; how these norms contributed to what kind of place MSC was in the 1960s; and how the culture of this place was laid out in the material terms of the brick ranch-style house with no front-facing windows, located in “good” neighborhoods.

The creation of a home in Houston for employees and their families was not independent from the creation of MSC. Through placemaking practices such as the

239 Ibid., 17.
240 Ibid., 19.

establishment of an exchange and an employee credit union, MSC was beginning to assemble its institutional identity in 1962. Like those on military bases, MSC's exchange would operate in part on military regulations for the resale of certain goods. The exchange would also oversee the "operation of a cafeteria or cafeterias," vending machines, and "employee activities such as banquets, dances, entertainment of official guests, picnics, athletic, and other recreational ventures."[241] As on military bases, purchasing goods at the MSC exchange was restricted to MSC personnel and their families, although contractors and guests could access other services. The creation of an exchange was a social process that designated and defined in and out groups associated with MSC.[242] Another such institution was the MSC's credit union, which in its earliest incarnation was located inside the temporary MSC headquarters building.[243]

These NASA employees were newly-minted MSC personnel and also new Texans and residents of Houston. The extent to which this status was bound up in an employees' membership in the organization of MSC was reflected in a memo about college tuition, which informed employees that "efforts will be made to waive out-of-state tuition rates for this Center's personnel and their dependents."[244] Thus, coming to Houston to create MSC also conferred a kind of naturalization of the employees as citizens of Texas, which immediately granted them status as residents with its associated benefits instead

241 Memo to Staff from Martin A. Byrnes, Jr., March 9, 1962, pp 2; STG MSC Organization Jan-March 1962; STG/MSC Organization 1962-1969 (Box 4); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).
242 Ibid., 7.
243 Memo to MSC Employees from Roy C. Aldridge, March 12, 1962; STG MSC Organization Jan-March 1962; STG/MSC Organization 1962-1969 (Box 4); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).
244 Memo to staff from Stuart H. Clarke, June 13, 1962; STG MSC Organization April-July 1962; STG/MSC Organization 1962-1969 (Box 4); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).

of waiting the usual 12 months. By the summer of 1962, MSC had more than 1700 employees and would add 600 more before the end of the year. By the end of 1963, the personnel total had risen to more than 3300.[245] The influx was partly existing employees moving to Houston from Langley and partly newly recruited personnel, who may or may not have been local to the area.

As part of the the process of helping employees move to Houston, someone at the agency made a series of polaroids of NASA's temporary facilities and of local housing and schools in the fall of 1963.[246] The polaroid photographs included images of new suburban housing developments, apartment complexes, and individual nearby homes available to rent or buy as well as "establishing" shots, which gave the viewer a sense of the landscapes around the site of MSC. These establishing shots provided a contrast to the manicured landscaping that was probably being installed at the same time. One image of Flamingo Bay showed a grassy plain with a stand of scraggly trees that marched in silhouette across the frame. In the background, the horizon of the bay was almost indistinguishable from the sky, and there were no people or buildings in the image at all. Another image, taken from the West Mansion, which was sited on land adjacent to the initial grant made to NASA by Rice, looked through the trunks of the same thin trees, these with low grass and shrubs at their feet and seemingly hung with wispy moss or leaves. (Figure 4.5)

245 Van Nummen, Jane and. Bruno, Leonard C with Rover L. Rosholt. "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration. NASA SP-4012 (1976): 73.

246 These images are simply dated 1963 by the archivists, but I was able to be more precise because of the information recorded about water and hurricane damage on the backs of the photographs. Cindy was the only hurricane to make landfall in Texas in 1963, and it did so in September.

A photograph of what would become the leafy neighborhood of El Lago showed a paved street, one old-fashioned looking street lamp, and, presumably, the photographer's car parked at the side of the road with one door open. The street was edged by mature woods, some of which prepared to have recently been cleared out for development. These images were reminders that the community surrounding MSC, like MSC itself, did not spring fully formed from the Texas plain when NASA arrived there in 1961. But the next image in the set, which looked down the other side of the street in the same location, showed a tidy neighborhood with finished sidewalks and cars in driveways.

The photographer sampled the costs of available real estate, which he on the backs of photos in pencil. Prices for houses ranged from a place in Fairmont Park with no air conditioning for $14,950 to a house in Timber Cove, where many of the Mercury astronauts had built their homes, for $35,000. The set included images of apartments, such as the Weslow Manor, on the back of which the photographer scrawled "Don't really recommend." A large two-bedroom there rented for $94 a month. There were two images of schools: one of the exterior of La Porte High School taken from the road and another of the interior of the kindergarten classroom at Seabrook Elementary School. All but one of the houses photographed were the ranch-style homes that employees told *Roundup* they preferred. The outlier was a modernist construction of a layered stone curtain wall topped with a white concrete box cantilevered over it, with floor to ceiling windows across the front. It was one of the more expensive homes priced at $27,000, which was equal to the very top salary bracket at the agency at the time, but the

photographer noted that even though this property was situated on the water, there was *no hurricane damage*. (Figure 4.6) If employees had already faced anxieties about snakes and good neighborhoods, they were no doubt unsettled by the arrival of Hurricane Cindy in the Gulf in the fall of 1963. Coming only two years after the devastation of Carla, the storm must have caused at least a few second thoughts. It was at least on the minds of those responsible for documenting and completing the move.

It seemed that the photographer drove all the way to Galveston, probably not to photograph homes there as none appeared in this set of images, but to observe the more serious hurricane damage along the Gulf coast. The single photograph from Galveston depicted a lot fronting Galveston Bay that may have contained a house. In the foreground was a twisted chain-link fence, cinder blocks, and piles of debris among bent and broken trees. In the background, a swing set still stood, flanked by more debris, and what could be pylons that once held a structure. More damaged trees framed the middle distance, where someone had propped up a large piece of debris and painted “Gone with the Wind” in sardonic, lilting letters. (Figure 4.7)

Other images contained similar annotations about hurricane damage. Taken together they were a tool for placemaking for employees who could not visit to get an in-person sense of place at a second-hand remove. Together with the information they contained about whether each location was damaged by the hurricane, the type and quality of available housing and the appearance of the surrounding environment, these photographs formed a prescriptive geography that was used to help employees make

decisions about the kind of life they wanted to build when they arrived in Texas. Making a home in Houston meant participating in the creation of a new community, one that would be structured by and would itself influence the space center taking shape in its midst.

Welcome to MSC

The mostly-completed permanent site of MSC was opened to the public in 1964 for an open house early in June. *Space News Roundup* produced a special edition of the newspaper documenting the new center and the public activities planned for the open house. Visitors could enjoy exhibits in the lobby of the auditorium building where they could watch films about the space program. Models of the center itself and of various spacecraft were on display alongside Scott Carpenter's space suit.[247] Outside, visitors could examine "a full scale mock-up of the Gemini spacecraft" as well as Mercury and Apollo hardware. The paper also specified that MSC would be open to the public each Sunday, as with similar tours KSC, even if limited parking meant that they could only tour by car.[248]

The rest of the special issue was dedicated to updates about the Apollo program and information about MSC's new facilities. In the centerfold, taking up the entire width of the double page, was a panoramic photograph of MSC taken from the same angle as the hazy, dreamlike artist's concepts that NASA had been distributing only a couple of years before. This image was sharp, taken on a bright day with puffy clouds in the

247 "Manned Spacecraft Center Open for Public VIewing," *Space News Roundup* n.d. (1964). Collection of the author.
248 Ibid.

background. What looked like water or lush landscaping in the foreground of the artist's concepts was revealed to be a broad paved street, and the immense trees were replaced by real saplings planted in the borders of a parking lot filled with cars. But the large central Building 2, which housed the executive management and many administrative functions, was exactly the same, rising up over the complex of lower buildings like a white opera cake.

Page 7 contained a kind of visual index of other buildings at the center and displayed the architectural cohesion of the campus that the temporary facilities could never have. Like Building 2, Buildings 4 and 12 consisted of even "layers" drawn in concrete panels that protruded slightly over the windows slightly for shade and were supported by thin columns. Other buildings, such as 15, 13, 16, and 30 had large windowless sections that were decorated with dark, inlaid vertical rectangle patterns.[249] (Figure 4.8)

It was clear that the building program followed the central tenets of suburban corporate pastoral design, despite the fact that the trees and landscaping around MSC in the photographs were necessarily immature in these renderings. The index images of buildings 4 and 12, for instance, were taken from the other side of a decorative pond, ringed with large river rocks, so that the pond appeared in the foreground. And the scrawny saplings in the panorama would, of course, eventually grow tall and shady. Unlike at KSC, where the aesthetics of nature surrounding the site were predicated on an idea of untamed wilderness, MSC's neatly landscaped grounds were meant to signal the center's connection to both corporate culture and to the ideals of suburban middle-

249 Ibid., 7.

class life. The orderly contact with nature represented by the pastoral ideal was also reflected in MSC's management culture and in the new suburban communities of employees that were created in around it.

Although the special *Roundup* issue was dedicated to documenting and celebrating the completion of permanent facilities, the identity of the place that was becoming MSC was not as stable or permanent as were the new buildings. The construction of the facility and its identity

was still incomplete in one major respect. The paper also printed a short letter from Robert Gilruth that explained the new facilities and functions of MSC and looked forward to the ultimate role of the center. In particular, the Mission Control Center, which would take over ground control operations from Mercury Control in Florida and for which detailed plans were already in place, "will be the focal point of the flight missions. As time goes by, complete direction of future flights in the Gemini and Apollo programs from liftoff through recovery operations will emanate from this building."[250] The back page of the paper was capped with a picture of Building 30, which, even though its exterior was rarely pictured, was no doubt the most famous building on the campus. Here, in a matter of months, the Mission Control Center would begin ground control operations. The accompanying text fairly anticipated the importance of Mission Control to the larger public understanding of the space program, predicting that it "will be a focal point to all Americans as well as the rest of the world in years to come."[251] At the bottom of the page was another artist's concept of what would become the control room.

250 Ibid.
251 Ibid., 8.

(Figure 4.9) This room was perhaps the most iconic space in the American space program and certainly the most recognizable place in the complex of facilities that NASA built in Houston. Mission Control would come to stand in for MSC, later Johnson Space Center, in the way that the name “Houston” did for Mission Control itself. But in this moment, the most famous part of MSC’s identity was still a concept illustration, still under construction, and still an unstable and unrealized space place.

A decade later in 1974 in a small ceremony in Houston, MSC officially adopted the name of its presidential patron and became the Lyndon B. Johnson Space Center. On February 17 of that year, the agency issued a notice of the redesignatio. Then in August, it announced that a formal

dedication ceremony would take place at the end of the month and feature the Lackland Air Force Band and a visit with a short speech from a still-grieving Lady Bird herself.[252] As with the decline of the Apollo program and efforts to scale back space initiatives, the renaming of MSC in 1974 marked the end of one era and the beginning of another. Two brochures from this moment of transition, one bearing the name MSC and the other JSC, illustrated that the name change was merely the earliest indicator of change coming to the center. (Figure 4.10) Both brochures were wayfinding tools, much like the earlier maps the agency made of its temporary facilities for employees and contractors who visited the site for professional reasons and they are nearly identical. In many respects, however, the center had only recently achieved a certain stability of place, which had been imagined and enacted through various placemaking practices

252 NASA Notice no. 1132 “Redesignation of the Manned Spacecraft Center as the Lyndon B. Johnson Space Center,” February 17, 1973. NASA Notice no. 73-120 “Dedication Ceremony of Johnson Space Center. Johnson Space Center History Files, Organization Series, Box 12. Neumann Library Archives, University of Houston Clear Lake.

throughout the 1960s. The brief years that MSC spent in various configurations of temporary facilities and in pursuit of a larger community were processes as important to the construction of MSC as a coherent place and institution as would be the completion of permanent facilities. The provision of images of the physical facilities being built for the center, its management structures, and the potential home life employees could expect in Houston were an essential practice of placemaking in the formative early years of the 1960s. Drawing on familiar models of middle class corporate and suburban culture, these images allowed employees to visualize their new lives in Texas. As part of what observers in Houston saw as a revolutionary new intellectual geography in the Southeast, MSC adopted both the tenets of managerial capitalism and its physical surrounds, actively visualizing and planning for both in the years the center operated out of temporary facilities.

5. “People and Wives": Women Out of Place at Kennedy Space Center

Most people in the United States and around the world experienced the space program of the 1960s entirely secondhand. They watched television broadcasts of launches and updates on mission progress. They leafed through photo magazines and read articles about the experiences of astronauts and their families. If they were scientifically inclined, perhaps they caught up with technical details in science publications or even academic journals. Children’s magazines and books for young readers introduced space missions to school-aged kids, and they may have even asked their parents to order View-Master slides or model spacecraft from the advertisements. Perhaps they were lucky enough to visit the futuristic space city of Tomorrowland at Disneyland, or they simply imagined themselves as astronauts while drinking Tang.[253] Even when Kennedy Space Center (KSC) became a huge tourist attraction with the introduction of driving tours, followed by bus tours and a visitor’s center, those who managed to see a rocket launch in person from KSC property were still a relatively select group. In the very earliest days of the Mercury and Gemini programs, guests were invited to KSC for launch events: contractors, Air Force personnel, members the Chamber of Commerce, local organizations, and VIPs that included Members of Congress or celebrities. Even fewer people, only about 2500 total by 1965, experienced the day-to-day operations of the center as permanent NASA employees.

Both the experience of viewing a launch and of working at the installation were different

253 See Dave Meerman Scott and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (The MIT Press, 2014): 47.

for women than they were for men. In KSC's own employee newspaper, *Spaceport News*, women employees were treated as anomalous figures whose contributions to spaceflight were thought of as menial support work, and they were often represented in the paper as caricatures and pin-ups. Like all NASA installations in the 1960s, the majority of KSC employees were men. At the launches, women were managed in the choreography of these huge events as discrete, gendered groups for which site access was carefully controlled. Women were expected to be seen only in certain controlled ways, namely as part of groups of "wives" and never in a manner that might upstage the technological spectacle of the launch itself. When women left their assigned spaces or appeared to draw attention to themselves, they were viewed as disruptive. The experiences of women employees and visitors had to do both with looking and being seen. The images in *Spaceport News* were constructed to appeal to the men who worked at the installation and to marginalize the few women workers at KSC as decorative figures with non-essential jobs.[254]

Beginning in 1963 when it was still called the Launch Operations Center, KSC was forming a public and institutional image for itself even as construction proceeded on its new facilities, including the iconic Vehicle Assembly Building. In chapter 3, I examined how images of the environment established an aesthetic distinction between NASA's high technology activities and facilities and the seemingly primitive, tropical surroundings of its location on Florida's east coast. In this chapter, I analyze representations of women in internal NASA communications and in public, all of which

254 Portions of this chapter were first published online in Anna Reser, "'People and Wives': Gendered Spaces at America's Spaceport," *Lady Science* September 6, 2018. https://www.ladyscience.com/blog/people-and-wives-gendered-spaces-at-americas-spaceport (Last accessed March 13, 2019).

demonstrate the restrictions on how women were allowed to look and take part in the spectacle at launch events and how they were allowed to be seen both as employees and as guests. These representations illustrate how specific gendered practices of looking contributed to a sense of place at NASA field installations.

Women at NASA: Histories and Representation

An in-depth social or labor history of the women who worked at KSC in the early years of the American space program has yet to be written. Nanci Schwartz has begun the process of piecing this history together by situating the history of women workers at KSC within broader patterns of women's employment in the United States in the twentieth century. Her study documents an increase in women in technical, as opposed to clerical, positions over time.[255] I draw many of the same conclusions as Schwartz, namely that the representation of women in *Spaceport News* is reflective of the social and cultural position of women at the agency and in the larger workforce. Schwartz argues that women workers were viewed as anomalous presences in scientific or technical fields, particularly after the end of World War II.[256] Despite being invited into these fields during the war to fill vacancies left by men who left their work to serve in the armed forces, many women were pushed out of technical work in the postwar years.

255 Schwartz, Nanci, "'A Man's World?': A Study of Female Workers at NASA's Kennedy Space Center." (Master's Thesis, University of Central Florida, 2004). There are several bodies of sources that could support such a large scale study. In addition to the representations of women in employee newspapers analysed in this study, most NASA centers published similar circulars for employees, and many have been digitized. See for example *Goddard News*, the internal newspaper of Goddard Space Flight Center: https://gsfcir.gsfc.nasa.gov/goddardnews (Last accessed March 9, 2019). The Johnson Space Center Oral History project contains extensive interviews with employees from numerous NASA centers and related spaceflight facilities, from the 1950s to the present. Available online: https://historycollection.jsc.nasa.gov/JSCHistoryPortal/history/oral_histories/participants_full.htm (Last accessed March 9, 2019).
256 Ibid., 22.

In technical positions, the marginalization of women workers after the war was not a simple matter of men returning to take up their old positions. Like Schwawrtz's study, much of the scholarly attention to women workers in the space program has been devoted to the recovery of the history of women scientists and engineers or the related project of showing how formerly feminized labor such as computing came to be understood as technical work. The most influential of the latter type of study is Jennifer Light's research on women computers who worked on ENIAC during World War II.[257] Light argues that computer programming was originally feminized, "pink collar" clerical labor that only later acquired its popular image as a male-dominated profession when the prestige of computer programming had increased enough for men to move into the profession.[258] Light argues that the reason this history had been largely forgotten or misrepresented had to do with the way that media celebrated women in wartime work. Light presents a paradox in how the history of computing had generally been presented. Her study recovers the "hidden" history of women in early computing and also documents the way that the wartime press heralded women breaking into scientific and technical fields while it simultaneously marginalized their contributions:

> [w]hile celebrating women's presence, wartime writing minimized the complexities of their actual work. While describing the difficulty of their tasks, it classified their occupations as subprofessional. While showcasing them in formerly male occupations, it celebrated their work for its femininity.[259]

This ambivalence about women in technological workplaces was characteristic of NASA's internal coverage of the women who worked at KSC as well. Although the war

257 Jennifer S. Light, "When Computers Were Women," *Technology and Culture* 40:3, (1999): 455-483.
258 On the history of women in computing, see also Marie Hicks, *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing* (The MIT Press, 2017), Joy Lisi Rankin, *A People's History of Computing in the United States* (Harvard University Press, 2018).
259 Light, "Computers," 456.

had concluded 20 years before *Spaceport News* began featuring the women workers of KSC in both pinup photoshoots and employee profiles, the sense that women were anomalous figures in a high technology project remained.

Subsequent studies of women computers at NASA installations have deepened scholars' understanding of the fraught place of women in the history of computing; however, they do not necessarily account for the way that the ambivalence Light describes operated specifically at KSC or how it applied to women in other professions within the project of spaceflight. Writer Margot Lee Shetterly has recovered the history of black women working as computers for the National Advisory Committee on Aeronautics, NASA's predecessor, at the Langley Memorial Aeronautical Laboratory in Virginia.[260] The lab was reorganized as the Langley Research Center when it came under NASA control in 1958. Working in racially segregated spaces, black women mathematicians were consistently marginalized even within a profession already highly stratified by gender. Although records of black engineers and professionals at KSC exist, the majority of these were men, and there has been no comprehensive study of the role of black women workers at the spaceport.[261] NASA did not collect employment data about gender and race until the 1970s, and as a result, there is even less information available about women who worked in clerical or administrative positions.[262]

260 Margot Lee Shetterly, Hidden Figures: *The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* (William Morrow, 2016). For an earlier history of women computers at the Harvard Observatory see Dava Sobel, *The Glass Universe: How the Ladies of the Harvard Observatory Took the Measure of the Stars* (Viking, 2016).
261 Richard Paul and Steven Moss, *We Could Not Fail: The First African Americans in the Space Program* (University of Texas Press, 2015).
262 Jane Van Nummen and Leonard C. Bruno, with Rover L. Rosholt, "NASA Historical Data Book, 1958-1968, Vol. 1: NASA Resources," National Aeronautics and Space Administration, NASA SP-4012 (1976). NASA Historical Data Books are available online: https://history.nasa.gov/SP-4012/cover.html. Last accessed February 12, 2019.

I examine representations of women broadly across my sources in this chapter. At KSC, most of the representations of women in *Spaceport News* were white women, as are the archival traces of women who attended launches.

Nathalia Holt has written about women computers at the Jet Propulsion Laboratory, a joint project of NASA and the California Institute of Technology in Pasadena.[263] Like Shetterly, and Light, Holt offers a corrective to popular assumptions about the role of women in the space program and argues that the perception of women workers in high technology projects as merely secretaries performing clerical labor is incorrect. She shows that there are many examples of women in technical professions within the space programs of the twentieth century. Part of the reason such women have been overlooked by historians can be traced to discussions of computing being viewed as menial, pink collar labor until the second half of the century. These histories, and especially the film adaptation of *Hidden Figures*, are vital revisions to a history of computing that has contributed to popular perceptions of an inherent masculinity of technology. While valuable contributions to the history of women in science and technology, these histories tend to specifically define and focus on "technical" professions, which can potentially contribute to the marginalization of women, such as secretaries, stenographers, and other clerical workers, in professions that were not considered technical. To distinguish too sharply between technical and non-technical labor by women working within large-scale technology projects like the space program risks repeating the marginalization of the representation practices I discuss in this

263 Nathalia Holt, *Rise of the Rocket Girls: The Women Who Propelled Us, from Missiles to the Moon to Mars* (Little, Brown and Company, 2016).

chapter; for example, when women who were actively employed by the space program were asked how women could contribute to the space program. I consider representations of these women alongside those of women who worked as engineers or scientists to show how they were marginalized at KSC because of their gender and because the labor they performed was seen as unskilled and feminized labor that functioned merely to support the more prestigious work with technology largely done by men.

Women were not only marginalized as workers at KSC. I build on the analyses of gendered divisions of labor by also analysing the marginalization of women who visited KSC and who were restricted in their movements and behavior while guests at launch events. This broader picture of the experience of women working in and encountering the space program suggests that gender played a significant role in the construction of the image of KSC as a masculine place where the animating mission of the high technology project of human spaceflight explicitly attempted to exclude and marginalize women.

Looking at Women in *Spaceport News*

The first issue of *Spaceport News,* an eight page employee circular written for personnel at NASA's Launch Operations Complex is Florida, was published December 13, 1962. Its stories included one about the name of the new paper, which was determined by contest; information about the upcoming federal holiday for employees; news of contracts recently let for new construction at the site; updates on new hires;

and a notice about a recent NASA Wives Club meeting. In a note to readers about the new publication, editors asked for information about "contract awards, construction progress, employe promotions, awards, retirements, speeches, people with unusual hobbies, etc. And, if a son of a NASA employee wins a scholarship, or a daughter wins a beauty contest, this would again make news."[264] While this was not meant, of course, to be an exhaustive catalog of the newsworthy things that daughters might accomplish, it was reflective of the paper's underlying gendered expectations for girls and women, expectations that were aligned with and reinforced in its coverage of adult women workers.[265] At KSC, boys won recognition for their intellect and girls for their physical attributes. In the pages of *Spaceport News*, women workers were represented as decorative pin-up figures or as cartoon caricatures. *Spaceport News* offered an ambivalent image of women workers as anomalous figures who were out of place in a high technology project like the space program.

A cartoon in one early issue featured a curvaceous secretary with enormous hair speaking to a bald, bespectacled man seated at a desk with an inbox labeled "Think." "I've just been cleared for secret! Got any you want to tell??" read the caption.[266] (Figure 5.1) The "Think" inbox on the man's desk signaled that his work was intellectual and consuming while that of his secretary was menial and that, perhaps, she was merely a distraction rather than an integral part of the serious labor of national security for which her clearance was granted. This cartoon was expanded into a series in which all of the

264 *Spaceport News* December 13, 1962. 2.
265 Studies from the 1950s showed that young Americans understood science primarily as a career choice for men, and one which demanded significant intellectual work that was antithetical to the labor of care that women would expected to do as adults. See Margaret Mead and Rhoda Metraux, "Image of the Scientist among High-School Students," *Science* 126, no. 3270 (1957): 384-390.
266 *Spaceport News* January 3 1963. 5.

cartoons depicted women making silly or ignorant jokes about security clearances and classified information, implying that women were much more interested in gossip than the serious work of national defense. "'I wish I hadn't been cleared for secret!!,'" said another cartoon worker in a wiggle dress, "It's driving me crazy not being able to talk."[267] (Figure 5.2) Women workers being something of a joke, and showed that the women portrayed in the cartoons were meant for consumption by the men who made up most of the paper's readership. The portrayal of real women who worked at the spaceport was carefully constructed to appeal to a male audience.

The first secretary cartoon shared an issue with a photograph and caption about a young woman working at NASA through a work-study program with the University of South Florida. The caption was headed "Figures and Figures" and described "Vivacious Ann Hauswald," who was working on a math degree. The rest of the caption explained her work study schedule and tellingly noted that "She is the only girl in the group of 16 students in the program."[268] As with the coverage of women computers during the war, *Spaceport News* attempted to celebrate the presence of women while simultaneously drawing attention to their scarcity in the workforce.

The earliest issues of the paper were fairly jammed with similar references and representations of women. The very next week contained a regular feature that consisted of letters received by the Public Information Office. Some letters appeared to have been written by children, and the small illustration of a child writing a letter with the

267 *Spaceport News* January 24, 1963. 3
268 *Spaceport News* January 3, 1963. 6.

clumsily handwritten title “dere cape canabrel” reinforced the image. The letter in the January 10 issue read,

> The boy members of the 7th grade have a huge problem. We have tried everything in our power to get rid of a female, Marie P., Sacred Heart Grounds, Belmont, North Carolina. We’ve come to the conclusion of sending her to Pluto, so we’ll never see her again. Please write her and tell her what flight she can take to the farthest planet away.[269]

Other such letters seemed to come from adults, such as one from the next issue that asked if women might make better astronauts in part because of “the ability to put up with the monotony.”[270] The paper was littered with little knowing jokes like this about the menial nature of women’s work and their presumed unsuitability for higher status work. But it was the pin-ups of women employees that were most explicitly indicative of the place of women workers at KSC in its earliest days.

The front page of the issue from March 21, 1963 featured a small inset box with the title “The Inside Story” and a small photograph of a woman in a bathing suit. The “inside story” was simply four photographs of the same woman and a lengthy caption, not an article. The caption noted that “Evelyn Schwartz of [the Launch Operations Complex] LOC’s Technical Library Staff ushers in the first day of Spring with an enthusiastic game of catch in the surf.”[271] (Figure 5.3) The photographs featured a bikini-clad Schwartz posing in the surf with a beach ball. The caption was frank about the manufactured nature of “the story,” saying that if there was not a season change, “we wouldn’t have had any reason to run the pictures of Evelyn.”[272] These images were not merely similar

269 “dere cape canabrel” *Spaceport News* January 10, 1963. 2.
270 “dere cape canabrel” *Spaceport News* January 17, 1963. 8.
271 “Head for the Beach...Spring is Here!,” *Spaceport News* March 21, 1963. 3
272 Ibid.

to pin-ups or borrowing some common visual language; for the editors of the paper, they were literally pin-up images meant for men to consume. A similar photograph published in December of 1963 used the same seasonal excuse and was even more frank. The caption beneath a photograph of a young woman in a bathing suit and a sweater standing in the surf readm "Our goosepimpled pinup, Hilda Littleton of McDonnell, reminds us to bundle up — Saturday is the first official day of winter."[273] These "calendar girl" images were sprinkled throughout the paper in its early years. In October, the newspaper ran another pinup of an employee in honor of Halloween. Dressed in all black and holding a broomstick, "Pretty Patsy Burgess of LOC's Administrative Services Office, reminds us that tonight is Halloween. But if all witches were as bewitching as Patsy, who'd be afraid?"[274] (Figure 5.4)

The pin-ups appeared to be a staple for the paper. At the end of its first full year in operation, the *Spaceport News* reported that NASA facilities on Cape Kennedy would be open to the public for drive-through tours beginning Sunday, December 15, 1963.[275] The paper anticipated an enthusiastic response from spaceport employees and tourists alike, which it confirmed a month later in January 1964 with a photo essay about the driving tour. The essay featured two women employees, Jane Harbin and Kami Hanson, captured by the unseen lens of photographer Russ Hopkins.[276] The "scenes from the girl's tour" included shots of Harbin and Hanson driving a convertible through a security checkpoint and alongside the rocket gantries visible in the launch area. One photo

273 *Spaceport News*, December 19, 1963. 10.
274 *Spaceport News* October 31, 1963. 1.
275 "Cape Opens for Sunday Drive-Thru," *Spaceport News* December 12, 1963. 1
276 "Sunday 'Open House' Cape Tours Prove Popular to Tourists, Natives Alike," *Spaceport News* January 9, 1964.

depicted a security officer pointing the women in the right direction, even though there were clear "Do Not Enter Signs" right in front of the car, so as to keep "girls from getting off the tour route…"[277] In the same issue in which Patsy's Halloween pinup appeared, a small item titled "Air of Professionalism" reported on a talk that NASA Administrator James Webb had recently given that "touched on the air of professionalism that pervades the space program."[278] And it was clear from the way women employees are represented in *Spaceport News* that neither the editors or the women who posed for the pin-ups considered these images unprofessional, rather the photo shoots had been in good fun and meant take up column inches. But the inclusion of these images also made it clear that the audience for the newspaper was largely men, and that the women who worked at LOC were both something of a novelty and available for the entertainment of male employees.

In a paper for the mostly male employees of a high tech government installation, the overt objectification of women employees as pin-ups undercut much of the positive representation that may have resulted from women being featured in a professional capacity. The playfully staged photographs of the girls' tour contrasted with the report that took up the bottom half of the two page spread, which summarized findings from studies by the Civil Service Commission for the President's Commission on the Status of Working Women.[279] The report presented a series of "Assumptions" about working women, such as "Women have limited career aspirations," and provided accompanying facts that contradicted this assumption from the studies they had done. The mythbusting

277 Ibid., 5.
278 *Spaceport News* October 31, 1963. 1.
279 "Sunday 'Open House' Cape Tours Prove Popular to Tourists, Natives Alike," *Spaceport News* January 9, 1964.

format of the piece and its tone of enlightened admonition toward the assumers, contrasted with the photo essay on the same page, which implied, however cheekily, that as smart as they might have thought they were, women still required the direction of a male officer in order not to get lost on a very clearly marked road.

These sexualized images of women employees were placed, seemingly without any dissonance on the part of the editors, alongside more straightforward coverage of their work at KSC and their professional contributions to the space program. The June 20 issue from 1963 featured a special section on "Women's Role in Space" as well as a series of pin-up photos of "attractive angler Bettye Latham" posing in short shorts on a fishing boat.[280] (Figure 5.5) The issue's "Spotlight" section, an editor's note, was very clear about the role of women workers at LOC. The section noted that most space jobs were not as exciting as that of Valentina Tereshkova, who was a Russian cosmonaut and the first woman to fly in space, but there was a certainly a place for women in "such a highly technological and specialized field as space," because "[a] secretary, a file clerk, a typist, although performing relatively mundane duties, is by the nature of carrying out these duties relieving her boss so he (or she) may concentrate on more important matters."[281] The issue dedicated significant space to women who worked in professions that were either prestigious or technical, featuring a long profile of Sue Weissenegger, an agency lawyer; a piece about the possibility of women astronauts that turned into a brief profile of astronomer Nancy Roman; and a short piece about remarks by Senator Margaret Chase Smith about the contributions women had made to

280 *Spaceport News* June 20, 1963.
281 Ibid., 2.

space technology. Two small inset boxes discussed a response from NASA Headquarters to a young woman who inquired about jobs in space work and a description of “the ideal wife of an ideal astronaut” according to Walt Williams, then deputy director of the Manned Spacecraft Center.[282] On the last page, another “dere cape canabrel” letter came from Sandra L. who asked for help with the task appointed to her as the only girl member of a space club: pricing and buying food.

The typists and file clerks that the editor’s note wrote about were grouped together on a facing page with their short responses to the question of “how they felt members of their sex could best aid space programs.” These interviews were not the effort of *Spaceport News*, as the piece was re-published from *The Capeside Inquirer*.[283] The women who were interviewed discussed what they viewed as women’s most important contributions women to space efforts. Responses included “creating a pleasant working atmosphere”; “encouraging safe working habits”; helping to “keep the men’s morale high”; and embodying the adage that “Behind each successful man is a woman.”[284] It did not seem to occur to the staff at the *Inquirer* or to the editors of *Spaceport News* that women who worked for NASA *were* contributing to the space program in exactly the same way any of the men who worked there were — by doing their jobs. If they were not performing “mundane” work as secretaries, women could contribute to the space program as wives or, in the case of Sandra, by rehearsing the gendered labor of care they might expect to do in that capacity as adults. Like the breathless wartime coverage of women workers that minimized the importance of their work even as it celebrated their presence in high

282 Ibid., 4-5.
283 Ibid., 6.
284 Ibid.

technology jobs, posing the question about contributions to the space program to women *actively employed* by the space program contributed to the marginalization and devaluation of their labor. The distinction made between technical and clerical work and the gendered division of such labor contributed to the image of KSC as a high technology workplace run by men.[285]

Spaceport News' coverage of women employees contributed to practices of looking that reinforced the perception of spaceflight as a male-dominated profession But these representations would have had far more direct impact on the internal work culture at KSC than on larger public conversations about the role of women in spaceflight and their workplaces. In the early 1960s, much more visible debates about whether women should be recruited as astronauts reached all the way from the meeting rooms of NASA's mission planners to Congressional hearings. They sparked opinion pieces in *Life* magazine and a feature on a hopeful potential "astronautrix" in the pages of *Look* magazine. It was these more visible representations of women in space work that garnered public attention.

The *Look* cover story provided an especially clear depiction of the way women were distinctly out of place in the space program. Titled "Should A Girl Be First in Space," the story documented pilot Betty Skelton's experience undergoing the testing that NASA used to select the first seven astronaut candidates. Historian Margaret Weitekamp, in

285 On deskilling and the masculinization of technological labor in computing see Nathan L. Ensmenger, *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise* (The MIT Press, 2010), Janet Abbate, *Recoding Gender: Women's Changing Participation in Computing* (The MIT Press, 2012). For an accessible historiography of women in computing, see Joy Lisi Rankin, "Queens of Code," *Lady Science* June 19, 2015: https://www.ladyscience.com/queens-of-code/8qtk4wr1nx5goqusms1qo0pp2mjnrb.

her study of the first women to attempt to become astronauts, has written about the ways in which the *Look* feature highlighted how out of place Skelton was in both the facilities and the accoutrements of spaceflight. Weitekamp argues that this apparent contrast was intentional and part of the appeal of the spread:

> At Brooks Aerospace Medical School, since a female test subject had never been anticipated, the school could not provide anything for her to wear. With no clothes or footwear small enough for her, Skelton spent her visit wearing a tightly belted and rolled-up man's jumpsuit and her own high-heeled dress shoes. At another site, *Look*'s photographs showed her having kicked off her shoes and stuffed her full skirt into a spinning test chair. Either way, the lack of appropriate clothes visibly marked Skelton as out of place. Indeed, the *Look* photo spread's interest relied on showing a petite woman taking on oversized men's challenges.[286]

Being small and light, which was ideal for space missions where every ounce sent into orbit was expensive, and possessing excellent experience and skills as an aerobatic flyer, Skelton was an ideally competitive test subject. Despite these facts, Weitekamp argues that the *Look* feature actually emphasized how out of place a woman was at the high technology facilities where Skelton underwent testing and highlighted the narrow, and sometimes contradictory, expectations a woman astronaut would need to meet, such as maintaining a marriage and family while being willing to risk sterility, or being both unobtrusive to male members of the crew while also being a soothing, mothering presence.[287]

Historian Matthew Hersch has also argued that the professional culture of male astronauts in the early years of the space program necessarily precluded the inclusion of women. Not only did they testify against such a proposal in front of congress, Hersch

286 Ibid., 68-69.
287 Margaret A. Weitekamp, *Right Stuff, Wrong Sex: America's First Women in Space Program* (Johns Hopkins University Press, 2005): 67-68.

contends,

> Women appeared in the astronauts' lives as wives or girlfriends, where they served as valuable public relations tools or, as Wernher von Braun once described (supposedly quoting Robert GIlruth), "recreational equipment." Even female support staff at NASA were relatively rare; "Nurse to the Astronauts" Dee O'Hara recalled that NASA seemed to want as few women as possible. It is unclear if male astronauts would have welcomed (as some of them suggested) women pilots who possessed the necessary qualifications…[288]

In 1963, the Russian cosmonaut Valentina Tereshkova became to the first woman to fly in space, spurring on debate in the United States about whether women should be considered for astronaut candidacy. By this time, American astronauts had testified before Congress that they believed that women astronauts contradicted some inviolable rules of ordered society in which men were responsible for the technologies of spaceflight and women simply were not.[289] In a 1963 feature about Tereshkova's flight, *Life* magazine focused on her lack of technical expertise and highlighted the apparent contrast between the "blue-eyed blonde" cosmonaut's femininity and her historic flight.[290] The piece also offers a backhanded compliment to the women who had tried, only a year before, to make their case for astronaut candidacy by noting that "[m]uch better qualified than Valentina were 13 American women," who were prevented from becoming astronauts by "NASA's outstanding lack of enthusiasm." The piece took jabs at Tereshkova's relative lack of technical skills by noting that Russian spacecraft can accommodate all kinds of technological backups and redundancies to mitigate the risk of an unqualified pilot.[291] The piece was meant to downplay Tereshkova's flight and

288 Matthew H. Hersch, *Inventing the American Astronaut* (Palgrave Macmillan, 2012): 152
289 Ibid., 151.
290 "She Orbits Over the Sex Barrier," *Life*, June 28, 1963.
291 Ibid., 28.

portray it not as a signal of the USSR's enlightened gender norms but as a dangerous publicity stunt that the rational, professional American space program would never attempt. Thus, Tereshkova's flight was seen by some as a mark of the technological and ideological superiority of the United States. But the issue of the relative equality of women in the United States and in the USSR was also at stake in debates about Tereshkova's flight and the possibility of American women flying in space.

In the same issue, Clare Boothe Luce offered a rebuttal to this argument. Instead of mocking the Russians for the apparent publicity stunt of sending a woman to space, she asserted that the United States needed to come to terms with what Tereshkova's flight represented in the ideological battle between capitalism and communism. Luce wrote that dismissing Tereshkova's flight as either propaganda or as a sexualized stunt meant to "sell" communism was a dangerous underestimation of the ideological stakes of the flight. Instead, Luce wrote, "the right answer [to the questions posed by Tereshkova's flight] is that Soviet Russia put a woman in space because Communism preaches and, since the Revolution of 1917, has tried to practice the inherent equality of men and women."[292] Luce argued that unless the US similarly signalled to American women that there was a place for them in the "glory of conquering space," the Soviet Union would have won a key battle in the war for hearts and minds.[293]

Even when women were eventually admitted to the astronaut corps in the late 1970s, it was immediately clear that little thought had been given to their status. Historian Amy

292 Clare Boothe Luce, "An Amateur Chutist Takes a Giant Leap, But Some People Simply Never Get the Message," *Life* June 28, 1963. 31.
293 Ibid.

Foster documents the logistical and cultural adjustments that NASA had to make in order to accommodate women astronauts. The actual technologies of spaceflight had to be redesigned for women astronauts, including new spacesuits that fit women's bodies as well as more intimate technologies such as urine collection.[294] The fact that women's restrooms and locker rooms had to be added to astronaut training facilities demonstrates how many obstacles lay in the path of the creation of a place for women in spaceflight. These logistical and technological modifications proved to be a decades-long project, one that is arguably still incomplete.[295]

The debate in the early 1960s about women becoming astronauts took on the fever pitch of the space race as a whole, and the cultural contest it represented. With the stakes so high, the debate about women in space necessarily overshadowed representation of other women who worked in the space program, but it touched on the same issues, down to the sexualization of women who seemed to be out of place in a man's profession.

Women at Work in the Space Program at the end of the 1960s

By the summer of 1969, human spaceflight had reached its peak popularity and visibility; it was the year that the United States finally "won" its space race with the Soviet Union when astronauts landed on the moon in July. A series of articles profiling women space workers ran that same summer and fall in the *Los Angeles Times.* Reporter Ursula Vils contributed to a series on the women who worked for NASA and as

294 Amy E. Foster, *Integrating Women into the Astronaut Corps: Politics and Logistics at NASA, 1972–2004* (Johns Hopkins University Press, 2011): 125.
295 Ibid., 100.

contractors throughout the 1960s and 1970s at MSC in Houston, Texas and other NASA centers. Vils's coverage of the space program was a collective portrait of women negotiating their place within a professional culture and within a society that was still tightly constrained by strict post-war gender ideologies, both of which viewed technical work as the domain of men and care of home and family as the proper preserve of women.[296] These articles suggest that even if the internal image of women at KSC was limited in its reach or overshadowed by debates about women astronauts, by the end of the decade NASA centers were still seen as male-dominated spaces, and the work that women did for the space program was still closely identified with menial or caring labor, even in the case of women who were engineers or scientists.

When writing about women who performed clerical or administrative work, Vils, like the *Spaceport News* cartoons about gossipy secretaries, emphasized interpersonal aspects of that labor. Vils profiled Marilyn Bockting in 1969 when she was assistant to George Low, who was at the time Manager of the Apollo Spacecraft Program Office at MSC.[297] Bockting managed Low's calendar and correspondence, and a large part of her job consisted of screening and answering letters from the public. Vils portrayed her as something of an informant about the lives of the wives and families of astronauts and administrators whose stories were highly sought-after by the press and public. "The Lows have five children," Bockting reported, "and Mrs. Low says she even had to schedule her last baby around Gordon Cooper's flight." But, contrary to Vils's portrayal, Bockting was no idle gossip; she went on to become one of the first women to be

296 This section is adapted from material first published in Anna Reser, "The Lost Stories of NASA's 'Pink Collar' Workforce," *The Atlantic*, February 15, 2017. Online. https://www.theatlantic.com/science/archive/2017/02/ursula-vils-nasa/516468/.
297 Ursula Vils, "A Paperwork Dynamo in Space World," *Los Angeles Times,* October 10, 1969.

promoted to a management position at NASA.[298] Women in the workplace were still somewhat anomalous in the 1960s, but women in high technology fields were even more unusual. Like *Spaceport News*'s confused coverage of women space workers, Vils struck an uneasy balance between describing Bockting's professional achievements and affirming her supposed interest in the properly feminine domestic concerns of her supervisor and his family.

Vils applied the same framing to women in technical positions and to those trained as scientists and engineers. Vils opened her story on Dr. Irene L. Lange, who was recruited by NASA to study the budgeting of the project, and noted wryly that "[i]t was bound to happen. Man thought of a way to get to the moon and then looked around for a woman to show him the most economical way to do it."[299] Although Dr. Lange, a professor of marketing, was a highly educated expert, Vils wrote that Lange sought to determine "if the cost of space travel can be reduced by putting to use some age-old practices every housewife uses in the grocery store."[300] Lange's suggestions, seemingly common sense ideas such as buying in bulk and maintaining inventory, were presented by Vils as special knowledge to which women, as managers of households, had privileged access. Vils also profiled Rita Rapp, an "aerospace technologist—environmental physiology," whose job entailed the packing and organizing of food containers onboard spacecraft.[301] In the piece, Rapp described astronaut food, noting that "[a]lso with the freeze-dried rehydratable foods, the astronauts can eat with a spoon, which means we can use larger chunks of food. It's the difference between baby

298 "Remembering Marilyn Bockting," *Space News Roundup*, April 18, 1986. 1
299 Ursula Vils, "NASA Calls on a Woman to Cut Moon Flight Costs," *Los Angeles Times*, May 29, 1969.
300 Ibid.
301 Ursula Vils, "Apollo Bill of Fare: Astronaut' Food Is a Big Job," *Los Angeles Times,* October 8, 1969.

foods and junior foods." But later she said that her job related more to "viewing food as the hardware—it's my job to see it's on board the spacecraft," suggesting that the domestic analogy of baby food and all it connotes about women being responsible for food in the home was secondary to the technological aspects of the job.[302]

The provision of special knowledge to women who worked as housewives, which Vils identified in her profiles of Lange and Rapp as the source of their expertise in space work, was an idea with roots in the early twentieth century. The fields of domestic engineering and scientific home management, initiated by women such as Lillian Gilbreth and Mary Pattison, determined new patterns of household management that were informed by scientific studies of labor, which included time-motion studies and the design of home interiors.[303] And, as with these early domestic engineers, Vils's characterization reinforced the notion that women were suited to certain kinds of work. This work involved care, providing food and clothing, and the careful management of household finances to conserve money. Although Lange and Rapp were highly skilled, educated technical workers, Vils, and to some extent the women themselves, proposed that their abilities were a direct result of their gender and its fitness for certain kinds of labor.

In *Spaceport News* and in Vils' more widely circulated profiles, women space workers were caught between conflicting representations. They were portrayed as professionals whose work was integral to the efficient running of the space program, but they were

302 Ibid.
303 Mary Pattison, *The Business of Home Management: The Principles of Domestic Engineering* (New York, Robert M. McBride & Co., 1918). Lillian Moller Gilbreth, *The Home-Maker and her Job* (D. Appleton and Co., 1938).

also insultingly questioned about their contributions even while they were at work. They were recruited to fluffy, overtly sexualized pin-up “stories” for their own employee newspaper while at the same time that same paper sought to debunk sexist myths about women in the workplace.

This gendered organization at KSC was not merely a matter of mid-century norms in the workplace, however. It was also a *spatial* organization, one that sought to control the behavior and movement of women at KSC who were not employees, particularly those who came to the installation to witness the great spectacle of a rocket launch.

Seeing and Being Seen at Kennedy Space Center

The end of 1965 was a busy time for KSC. The Public Affairs Office (PAO), headed by Gordon Harris, was coordinating the massive challenge of Gemini VII and VI launching within days of one another for their orbital rendezvous mission.[304] Launch events were massive undertakings for Harris’ office, which was in charge of inviting and managing guests and VIPs as well as the legions of press who came to the Cape to cover events. The PAO had to set up telephone lines, book hotel rooms and rental cars, schedule press pool photo shoots, and funnel crowds of eager spectators into safe viewing areas for the launches. A launch event was perhaps the most intense coalescence of the visuality of the American space program in which thousands of images were produced and transmitted, and thousands of spectators came to the Cape to witness it in person and —- in the case of the celebrities and VIPs in attendance —- to be seen doing so. If there is one sense that pervades the archival records of the PAO about these events, it

304 Gemini VII launched before VI, the latter used VII as a target for orbital rendezvous.

is one of Harris being harassed by infinite details in need of management.

Between the two launches, Harris wrote in a memo that the first launch event "left much to be desired in terms of the kinds of people who showed up as guests and their behavior," and he added that "[i]f we cannot obtain control," Harris would recommend ending the VIP program altogether and limiting guests to people "directly connected with the program."[305] In particular, Harris was concerned about having seen some children in an area where they should not have been permitted. The memo then listed some specific issues that Harris insisted must be resolved before Gemini VI launched a couple of weeks later. Contractors who worked with NASA were to be told that "[a]dults only can be admitted (18 years and over)" and that Chamber of Commerce executives as invited guests were to understand that "[w]ives of members cannot accompany them - the only women in the group should be Chamber members."[306] Harris' specific concern about the admission of women and children to these launch events contributed to the sense that the Cape was a dangerous place, the preserve of men and technology. Women and children would be admitted when necessary as in the case of the families of astronauts, but their presence at the launch needed to be carefully managed. Even more telling about the gendered organization of who was permitted to look and be seen at launch events were Harris' complaints about women celebrity guests and their apparent attention-seeking behavior.

305 Gordon Harris to Jim Loy, December 5, 1965; Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
306 Ibid.

The control exercised by PAO in VIP spaces was explicitly gendered. It can be seen in the categorization of "wives" as guests that were often differentiated in memos from "people," which meant employees of contractors or of NASA itself. In a memo from 1966 about the guests for Gemini XI, Harris referred to "two busloads of Air Force/NASA wives" as well as "Martin [Marietta Corporation] people and wives" and "McDonnell-SCO people and wives."[307] In the same memo, Harris directly connected that access to the launch for those women who were wives to access for children, noting that there was still an outstanding "question about admission of children of tender years in the case of Air Force/NASA wives…"[308] Banning children, even if there was no explicit ban on "wives" in other places, amounted to a de facto ban on women, who, as primary caregivers for children in America in the 1960s, would likely have had to stay behind with the kids.

NASA made more spaces at KSC available to the public through the 1960s and into the 1970s by instituting public tours, first by car and later by bus, as well as a visitors center with informational exhibits and a rocket garden. But there were still spaces within the center that were off limits for certain groups of people. Responding to an inquiry from a reporter in 1974, the Chief of the Public Information Branch noted that "since we are severely restricted in the number of places we can take children on the space center, we usually suggest to a newsman who wishes to tour with his family that they take the public bus tour."[309] A similar response to another reporter reiterated that children were

307 Gordon Harris to Albert Siepert, August 30, 1966; Gemini 11; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
308 Ibid.
309 Charles T. Hollinshead, Chief Public Information Branch, to Gene Bylinksy, February 13, 1974; Press

not allowed in spaces that a lone “newsman” might be and that the reporter would get a free pass while his wife and children would need to pay the regular fee.

Wives were not the only women whose access to and movement around the spaceport needed to be controlled. Harris also disapproved of what he considered “publicity-seeking” behavior by VIPs attending launches. Harris seemed particularly concerned about two women who were apparently out of place in the VIP area. In a list of “observations” about the launch of Gemini VII, Harris asked, “Who placed Miss Florida Citrus Queen on our Guest List?” He also seemed to believe that actor Shirley MacLaine was evidently engaged in unseemly publicity-seeking behavior at the launch of Gemini VI. “No more—we don’t want publicity seekers in those stands or in the area.”[310] Another memo from a day later reiterated the problems Harris saw with the VIP site and revealed Harris’ “specific instruction that she [Miss Florida Citrus Queen] would view the launch from the NASA causeway” instead of the VIP area, and he even insisted that the move was engineered by a local group for promotional purposes.[311]

In the archive, this memo is attached to a newspaper clipping featuring the Citrus Queen and two members of the Cocoa Chamber of Commerce. Captioned “Royal

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Relations; Public Information Branch 65-75, News Media Files, LH1 incident report, Foreign Relations, Gemini 3-5 PIO Files; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

310 Gordon Harris to Jim Loy, December 5 1965 (2); Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

311 Gordon Harris to Albert Siepert, December 6, 1966; Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

Advice for Bird Watchers," the image depicted the two Chamber members playing gin rummy and Karol Kelly, Citrus Queen, giving advice on the card game.[312] (Figure 5.6) In the photo, the two men were seated on the ground, looking up at Kelly, who was wearing her sash and crown. These men, members of the Cocoa Chamber, had drawn Harris' ire that day for playing cards in the viewing stands. No doubt the gambling and the slightly salacious image and caption seemed to Harris very disruptive to the image of a professional and orderly launch. Harris' annoyance with the Citrus Queen echoed sharply against *Spaceport News* asking for notice of daughters who won beauty pageants.

Replying to this and other complaints by Harris, Jim Loy offered point-by-point explanations of just what had happened to allow these women to subvert Harris' careful planning. It seems in most cases that the people who invited the women did so behind Harris' back. Loy also confirmed what Harris had heard about MacLaine being taken on a private tour of spaceport
facilities by Dee O'Hara, a nurse who worked with the astronauts. "I haven't the slightest idea where they went," Loy insisted.[313]

Only a few weeks later, Harris wrote again to Loy about another problematic woman, a reporter named Mary Bubb, who had contributed to an "unpleasant" incident when the

312 "Royal Advice for Birdwatchers," (Tribune Newsphoto) n.d, ca. 1965; Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).
313 Jim Loy to Gordon Harris, December 6, 1965. Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

astronauts returned to the Cape by “breaking thru [sic] the line and [participating in] the melee around the pilots.”[314] Curiously in this memo, Bubb was accused of disorderly behavior when it seems that she *joined* a “melee” already in progress. This contradiction more than suggested that Bubb, one of the only women reporters to cover the space program in the 1960s, was viewed as especially disruptive in an already disordered incident.[315]

It is clear from Harris’ memos that he considered the image of order and decorum to be an important part of the launch experience for guests and was deeply concerned about how this image reflected on KSC and on the agency as a whole. As a potential threat to this image, the unruly women Harris encountered at launches had to be carefully managed. It is important to note, of course, that these are the incidents and memos that have been preserved in the archive, and they may not reflect an actual breakdown of the gender of unruly guests at launches. Nevertheless, when read against the representation of women employees at the spaceport in its own newspaper, these incidents take on significance in that they contributed to an internal understanding and public image of the KSC as a masculine site where women’s access was subject to the tense negotiations that permeate the memos. By grouping and classifying women according to gender or marital status and by demarcating the ways such groups could access launch events, NASA reinforced gendered norms that constructed certain places

314 Gordon Harris to Jim Loy and Jack King, December 14, 1965. Gemini 6/7; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

315 Mary Bubb was the first woman to cover launches from Cape Canaveral. See “Mary Bubb,” NASA: The Chroniclers. Online: https://www.nasa.gov/centers/kennedy/about/history/chroniclers/bubb.html (Last Accessed February 16, 2019).

within the business and spectacle of spaceflight as masculine or feminine. Men's roles at launches were viewed as part of their jobs while women's presence was as spectators whose access was limited and whose behavior should be controlled. In Bubb's case, while reporting on the program was her job, her behavior was seen as extreme or otherwise worthy of note. When these norms were challenged by women with power or access like MacLaine and Bubb, the agency's response was to set further limits on their access to launches. While overt discrimination often foreclosed opportunities for women to participate in spaceflight by joining the astronaut corps or to rise to high-status positions within the agency, subtler forces were at work as well, and they operated on women who participated in spaceflight in different ways.

Seeing Women in Spaceflight

The experience of seeing and being seen at KSC as a woman employee or visitor in the early 1960s was a complex one of being looked at and overlooked, of being out of place at one's own desk and of being highly visible at public events at the space center. Images of women working at and visiting KSC in these early years were themselves placemaking practices, which signalled to employees and observers alike that women were anomalous figures in the high technology project of spaceflight and outsiders in the places of the space program. As scholars have recently shown, there were plenty of women working in the space program, performing many kinds of labor, even if women were unable to become astronauts until the late 1970s. Like the women computers whose presence in technical workplaces was celebrated during World War II even as their work in those places was devalued, *Spaceport News*' coverage of women workers

at KSC was ambivalent. Within a single issue, readers could see images that depicted employees as sexualized pinups while a facing page published a sober discussion of the place of women in the workforce. While the more visible debate about women astronauts dominated public discourse about women in space work, women who attempted to partake of spaceflight in person found access to KSC tightly controlled according to gender. Women who threatened to usurp the technological spectacle of the rocket launch were perceived as disruptive and attention-seeking.

Images of women participating in the space program as workers and as observers have been far more common than even the kind of “hidden figures” narratives that historians have recently recovered suggest. The representational conventions of these images marginalized women as “merely” clerical workers or objects of entertainment for male employees. They were also, in turn, part of the larger organizational culture of NASA that precluded the admission of women to the astronaut corps for nearly 20 years and to the strictly gendered representations of the wives of employees and astronauts, which I explore in more detail in chapter 6. Feminist revisions of the history of computing have been especially instructive in this regard because they have begun to reframe feminized labor, which has long been overlooked or denigrated as menial and merely clerical, as skilled technical labor that was instrumental in the creation computing technologies. Within the history of spaceflight, more study is needed to offer a similar reframing for the secretaries, typists, and stenographers who worked at NASA centers in the 1960s. By pointing out the representational conventions that contributed to their presence and labor being overlooked or marginalized, I argue that the search for “hidden figures” in

the history of spaceflight can be productively expanded by counting among them the secretaries, typists, stenographers, and receptionists who labored alongside engineers and technologists to accomplish the goals of human spaceflight. Furthermore, these practices of looking, the limits on women's ability to look, and the management of the way they were seen were all integral to the kind of place KSC was becoming in the early 1960s. Animated by a masculine spirit of technological enthusiasm and a frontier mentality, KSC was a place for men to look at both women and at technology, and for women to be seen, but only within certain limits.

6. "An honored female ritual": *Life* in the Homes of the Astronaut Families

In early 1963, the employee newsletter at Florida's Launch Operations Center ran a short piece about the homes of the Mercury astronauts, topped with a cute cartoon. The spaceman, fully suited, looked out of his windowless living room through a periscope he'd had installed in the ceiling. His wife and buzz-cut son, surrounded by comfortable looking mid-century furniture, looked on admiringly. (Figure 6.1) The piece beneath the cartoon gave a few details about the new homes and neighborhoods of the astronauts who had taken up residence in Houston, the new location of the Manned Spacecraft Center (MSC), the previous fall. Privacy was, the paper reported, the primary concern when astronauts chose locations and designed their new custom-built homes:

> A Houston homebuilder, Frank Marsters, had his problems recently, constructing houses for four Project Mercury astronauts. The spacemen, in searching residential areas surrounding the Manned Spacecraft Center, wanted privacy above all. Marsters and the astronauts settled on homes with windowless fronts, adding enclosed gardens to make up for the missing out-of-doors views. John Glenn, Scott Carpenter, Wally Schirra and Gus Grissom all moved within two blocks of each other, to a subdivision called Timber Cove.[316]

That the homes of astronauts were specifically designed without windows facing the street was one of the anecdotes that formed the beginnings of this project for me.[317] In April 2018, as I drove a rental car through Timber Cove, it seemed to me that the astronauts had chosen this leafy subdivision well if privacy was their concern. There are not any signs or markers to indicate that most of America's first astronauts once lived along these quiet, cul de sac streets edging the lake. Just across from a Lazywood Lane home, where hundreds of reporters once crowded Marilyn Lovell's lawn and porch

316 "Here Come the Schirra's, Dear," *Spaceport News* January 3, 1963. 7. Cartoon by Loren Fisher.
317 I first read it in Henry C. Dethloff, *Suddenly, Tomorrow Came...A History of the Johnson Space Center* (National Aeronautics and Space Administration, 1993).

in 1970 while she waited to hear if her husband and

his crew would survive their failed mission to the moon, is the Timber Cove recreation center, which contains the only obvious sign of the historic past of the neighborhood. The pool, built with funds raised by the wives of astronauts, is shaped like a Mercury spacecraft.[318] I confirmed this not with my eyes, even though I drove right by it, but with a Google Maps screenshot because I was too worried about how it would look to get out of the car and snap a picture of the pool over the fence. Even after all this time, the neighborhood seems to resist snooping. (Figure 6.2)

Despite their concern for privacy being so great that they often eschewed living room windows, the astronauts of the 1960s were an immense media spectacle. Famous and lauded as American heroes before they had made a single trip to space, the original seven astronauts selected for Project Mercury were subject to intense media attention throughout their astronaut careers. Their families also endured a great deal of public attention, particularly when each was flying a mission. The most comprehensive and memorable media coverage of astronaut families was carried out by the photo weekly magazine *Life*, which maintained an exclusive contract with astronauts for their personal stories throughout the 1960s.

This chapter analyzes *Life*'s coverage of the earliest human spaceflights in the 1960s, focusing on the carefully constructed narrative of the astronauts' wives' "vigil." Always

318 See Scott Carpenter and Kris Stoever, *For Spacious Skies: The Uncommon Journey of a Mercury Astronaut* (Thorndike Press, 2003).

undertaken at home in front of the TV and in privacy guaranteed by the exclusive contract, the ritual of wives and children watching the launch from homes was the primary way that the family life of astronauts was presented to *Life* readers. I compare *Life*'s coverage to newspaper coverage of the same events to understand how the *Life* contract shaped other media coverage of the "vigil"

and to show how important the material factors of this event are to the overall narrative. Absent the access that *Life* had, newspaper accounts took pains to include spatial and material details about the homes of the astronauts to lend some intimacy to their stories. I close with a discussion of the vigil in later popular culture, focusing on the depiction of this event in the film *Apollo 13*. The result of *Life*'s exclusive access and the effects it had on other media coverage was a durable public image of family life and the role played by women and wives in the space program. *Life*'s mission was to shore up the image of the American middle class and the material and spatial particulars of suburban family life. The image of the home and family life of early American astronauts should also be considered an important aspect of the history of space program places. Shaped by *Life* and other media coverage simultaneous with the physical construction of these new NASA facilities, the image of home in the space program was one of an idealized domestic order that was managed by women in the face of the uncertainty and danger of their husbands' high technology work.

Astronauts and the Image of American Family

Astronauts did not always live in suburbs. For the first seven astronauts selected by NASA, home had often been cramped military housing on the bases and airfields where

they worked as jet test pilots. These spartan early years of home life were introduced to the public by Tom Wolfe in 1979 with the publication of *The Right Stuff*, and later dramatized as a dusty sojourn on the arid hillsides surrounding Edwards Air Force Base in the 1983 film adaptation of the book.[319] After their selection in 1959, the astronauts moved their families to Virginia to be closer to the Langley Research Center, then the location of the Space Task Group, which was the NASA body in charge of human spaceflight. It was in these homes in Virginia, rather than the more familiar astronaut neighborhoods of Houston, that *Life* produced the earliest iterations of the vigil narrative of the lives of the astronauts' wives. When MSC was formed in 1961 and the agency announced that human spaceflight operations would move to Houston, astronauts and their families began the familiar process of moving across the country for a new assignment. By the end of Project Mercury, the original seven astronauts, plus a new group of nine selected in the autumn of 1962, were settling into new suburban developments in and around Clear Lake, many building their "dream homes" in neighborhoods such as El Lago and Timber Cove.

Life's coverage of astronaut families and the image it created of their tense vigils during missions was detached from a specific sense of place. The vigil played out the same in the pages of *Life*, whether it took place in Virginia or in Texas. This was in part because the suburbs were understood in the United States at midcentury to be interchangeable and placeless. The specific locality of suburbs was less important than their general geographic orientation to urban centers and their familiar look of single-family homes on

319 Tom Wolfe, *The Right Stuff* (Farrar, Straus and Giroux, 1979). *The Right Stuff* (1983). Dir. Philip Kaufman.

equally spaced lots with green lawns and tree-lined streets. Historian Lizabeth Cohen, in her history of American consumption in the postwar period, has written about how home itself became a commodity as suburban housing developments spread between the 1960s and the 1970s. Instead of choosing places to live based on "a particular neighborhood, ethnic community, or church parish," Americans were increasingly selecting "among homogeneous suburbs occupying distinctive rungs in a clear status hierarchy of communities."[320] Thanks in part to the extra income afforded the astronauts by the *Life* contract, astronauts were able to buy into the suburban middle-class lifestyle that they could not access while on active military duty. When they made the move to Houston, many were able to finally build their dream houses, thereby, achieving the highest rung of the housing hierarchy.

However, for middle-class Americans living in the suburbs, procuring a suitable house was only part of the project of creating a home. In her study of American family life in the postwar years, historian Elaine Tyler May has written about how young Americans were eager to establish stable family lives after World War II and to create a safe, private space apart from the perceived dangers and uncertainty of the outside world.[321] Home and family life in the Cold War was bound up with the larger social and political forces that shaped postwar American life. For white, middle-class American families, the ideal of suburban family life was also a political project that promised to ward off the

320 Lizabeth Cohen, *A Consumer's Republic," The Politics of Mass Consumption in Postwar America* (Vintage Books, 2003): 202.
321 Elaine Tyler May, *Homeward Bound: American Families in the Cold War* (Basic Books, 1988, 1999): ix. On suburban family life in America in the 20th century, see also Kenneth T. Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (Oxford University Press, 1985). See also Beatriz Colomina, *Domesticity at War* (The MIT Press, 2007).

damaging influences of communism and class conflict.[322] Creating a stable home life with all the trappings of modern suburban life was seen as a way for American families to demonstrate the ideological superiority of the United States.[323] For space workers, like astronauts, who saw themselves as part of the space program's direct competition with the Soviet Union, maintaining this life was part of their own contribution to the project. The dangers of the Cold War must have seemed much more immediate to people who worked in the space program, and thus, the protections offered by home and family life were that much more precious. For the families of astronauts, the perception of their homes as safe spaces governed by familiar norms of domestic patriarchal order was a central aspect of their public image. The early astronauts were characterized by the way they were backed up by "brave" wives who not only endured the stress of their husbands' dangerous work but maintained a functioning household during their frequent absences.

The dangers that faced middle-class families included the corporeal threat of nuclear war but also those posed by middle-class professional life. May shows how, despite a focus since the 1960s on how women's autonomy was curtailed in the postwar years, earlier observers noted that men in white collar professions suffered from the alienation of highly stratified, bureaucratic workplaces and that the intimacy and simplicity of home life was an important corrective to the pressures of professional life as a "organization man."[324] Historian Matthew Hersch has characterized astronauts as a similar type of

322 Ibid., xviii.
323 The political importance of American family life had as much to do with technology as the space race, see Ruth Oldenziel and Karin Zachmann, eds., *Cold War Kitchen: Americanization, Technology, and European Users* (The MIT Press, 2008).
324 Ibid., 14. See C. Wright Mills, *White Collar: The American Middle Classes* (Oxford University Press, 1951), and William H. White, *The Organization Man* (Simon and Schuster, 1956).

white collar professional in his labor history of the American astronaut corps. Hersch argues that it was not the apple-pie image that astronauts and NASA public relations people crafted for the public, nor was it the image of rugged, hard-drinking hyper-masculinity that emerged in the 1970s and amplified by accounts like Wolfe's *The Right Stuff.* what actually distinguished the early American astronauts. Rather, it was their technical knowledge and skills that defined their work culture in the early 1960s. Astronauts were educated engineers and gifted systems managers.[325] The astronauts' instant fame was a result of their willingness to face down the uncertainty and danger of human spaceflight, which had never been attempted.[326] While the real curiosities and scandals of the astronauts' real lives did not emerge until the end of the Apollo program, the image of the heroic and self-sacrificing astronaut projected by NASA in the early years of human spaceflight meshed well with the image of powerful and volatile rocket launches. Spaceflight was a dangerous endeavour, undertaken by brave men accustomed to living on the "edge of the envelope." The facilities and spacecraft in which they worked were dangerous places, both socially and existentially. These places were constructed in part *against* the image of stable family lives inside "dream houses" crafted by *Life*. The management of this part of the astronaut image was left to their wives.

The most well-known account of the lives of the wives of the Mercury astronauts is Lily Koppel's 2013 book *The Astronaut Wives Club*, which was later adapted into a short-lived television series for ABC.[327] Koppel's story is built around interviews with the wives

325 Matthew H. Hersch, *Inventing the American Astronaut* (Palgrave Macmillan, 2012): 30.
326 Ibid., 1.
327 Lily Koppel, *The Astronaut Wives Club: A True Story* (New York: Grand Central Publishing, 2013).

of astronauts, their children, and the astronauts themselves, and it documents the experiences of astronaut wives from Project Mercury through the Apollo era. NASA did not provide specific instruction to the wives of the first astronauts about how they should behave or how they should deal with their new fame and the subsequent media attention.[328] Instead, the women followed a more instinctual script they they built from their experiences as wives of military men and in accordance with the gendered expectations of the 1960s. By 1962, when the new class of astronauts was moving into their new homes in Houston, NASA had codified a protocol for wives that included all the expected duties of cooking and emotional support that went into creating a "refuge." This was seen as a necessity, because as Koppel writes,

> [a]djusting to normal conditions after a week in the pure oxygen bubble of a space-training capsule could knock a husband out, so he shouldn't be expected to do menial chores around the home. And for God's sake, keep the astronaut away from stress. He should never have to worry about the plumbing, or the dental bills, and he should never be nagged about his lack of initiative in the bedroom.[329]

Koppel relates how astronaut families, while largely conforming to expected mid-century gender roles, were shaped by their unique circumstances. The wives of astronauts, once they had moved to Houston and were building their "dream homes," were largely left alone to grapple with the physical realities of the construction and maintenance of their homes while their husbands were away in intensive, time-consuming training.[330] Marilyn Lovell had her home built according to her precise specifications and decorated it herself. Betty Grissom famously mowed her own lawn. The wives of astronauts were responsible for homemaking as were many other middle-class women in the 1960s, but

328 Ibid., 5-6.
329 Ibid., 106.
330 Ibid., 99.

the dangerous and stressful nature of their husbands' work added an urgency of purpose to portrayals of their duty to maintain their homes and family lives.

It was against the image of the dutiful wife that the astronaut identity was constructed. Daniel Sage has argued that "[a]stronaut identities have ostensibly long been constructed alongside their 'Other': the seemingly supportive yet demure, passive, domestically bound and rather abject astronaut's wife."[331] Sage suggests that spatial dimensions of the story of the "domestically bound" astronaut's wife concern "spatial division of labor that preserved a public/private (or production/reproduction) binary of masculine/feminine work."[332] But equally important were the ways in which those prescriptive norms for gendered work were subverted by the wives of astronauts when they took on tasks such as mowing the lawn, which their husbands would have ordinarily done.[333]

Images of the astronauts and their families have a complex history that has been reinterpreted many times since the 1960s. But the initial image of the domestic life of the families of the astronauts — and the one that would prove to be most durable — was that of the lonely, tense vigil of the wife who watched launch and mission coverage on live television at home with her children. This image, made possible by the exclusive

331 Daniel Sage, "Giant leaps and forgotten steps: NASA and the performance of gender," Bell, David and Parker, Martin, eds. *Space Travel & Culture: From Apollo to Space Tourism.* (Wiley Blackwell/The Sociological Review, 2009). 148.
332 Ibid., 152.
333 Ibid., 152. In the same volume, Dario Llinares writes about the film *Apollo 13*, to which I also turn at the end of this chapter, and Darren Jorgensen considers the aesthetic domestication of space travel and the uncanny contrast of high-technology with the feminine iconography of the age. Dario Llinares, "Idealized heroes of 'retrotopia': history, identity and the postmodern in *Apollo 13*," in Bell and Parker, *Space Travel and Culture*, 164-177. See also Dario Llinares, *The Astronaut: Cultural Mythology and Idealized Masculinity* (Cambridge Scholars, 2011). Darren Jorgensen, "Middle America, the moon, the sublime and the uncanny." in Bell and Parker, *Space Travel and Culture,* 178-189.

terms of the contract, would be what *Life* came to understand as its main subject in covering astronaut families. As one editor observed, "it is possible that *Look* or the *Saturday Evening Post* could cover as much of the professional phase of the astronauts as we can...what, in effect, we are buying, then, are the boudoir, breakfast nook and back porch of the astronauts...our exclusivity is entirely relegated to their personal lives."[334] *Life*'s coverage of the astronauts and the space program would be amongst its most famous — and amongst its final efforts, as the 1960s would be its last decade in print.[335]

Life, founded by Henry Luce in 1936, reached the height of its popularity and influence in the 1950s. During this period, *Life* reflected a mainstream culture of social and political consensus in the years after World War II, but more than that, it helped to cultivate that culture as well. *Life*'s mission was in part to teach the American people to look to the image as a serious source of news and information. *Life's* circulation of about six million made it an influential source for news and culture in mid-century America.[336]

Life magazine's coverage of the American space program, beginning with the announcement of the Mercury 7 astronauts in 1959, was an important site for public engagement with human spaceflight throughout the 1960s. In its glossy photo pages, Americans could learn details about the daring flights of astronauts, and they could look

334 Quoted in Kristen Amanda Starr, "NASA's Hidden Power: NACA/NASA Public Relations and the Cold War, 1954-1967 (PhD Dissertation, Auburn University, 2008): 259.
335 Google Books maintains a searchable digitized archive of the complete print run of *Life*. Any of the spreads discussed in this chapter can viewed and searched online for free: https://books.google.com/books/about/LIFE.html?id=R1cEAAAAMBAJ.
336 Erika Doss, ed., *Looking at* Life *Magazine*, (Smithsonian Institution Press, 2001): 11.

right into the astronauts' living rooms, even their bedrooms, to meet their wives and children, their parents, and close friends.

In 1959, *Life* gave the public their first look at the families of the astronauts with a feature on Project Mercury.[337] The section, headlined "Backing Up the Men, Brave Wives and Bright Children," was used to ground the coverage of the astronauts and their extraordinary mission in the familiarity of the middle-class family, a mythologized entity that *Life* itself had helped to construct over the course of its own history. In *Life*'s image of astronaut family life, the material concerns of home were important anchors to normalcy in the high technology, dangerous profession of space work. In *Life*, it was the responsibility of the wives to maintain this essential anchor, to worry over domestic details, and to provide astronauts with a haven of normalcy and order that would both protect the astronauts from the dangers of spaceflight and enable them to face them when the time came.

Scholars have often looked to *Life* as an important primary document of American life in the twentieth century. As Erika Doss has shown, *Life* was from the outset concerned with using pictures to present and encourage a normative vision of an American middle class that was carefully pieced together by writers, editors, and most especially photographers:

> ...*Life*'s editors understood pictures as an indispensable 'means of social control' and recognized the camera's "capabilities for documentation and surveillance" as a primary instrument in their mass media construction of a stable and 'regulated'

337 "Backing Up the Men, Brave Wives and Bright Children," *Life*, (April 20, 1959) 24-25.

> modern middle-class America.[338]

A prescriptive depiction of the American family was a mainstay of *Life*'s coverage, and the lens through which the magazine covered national and global events. VIsualizing family life in America was part of *Life*'s political project. As historian Wendy Kozol has argued that

> Family pictures in *Life*'s news stories reveal the historical entanglement of political and cultural modes in postwar culture. Realistic visual media like photographs are crucial vehicles for representing and legitimating the political and ideological because they seem familiar and are presumably easily read.[339]

Life was invested in the political and ideological possibilities of an approach to news that naturalized certain values and lifestyles through candid, naturalistic documentary photography. *Life* was not simply providing an undistorted reflection of consensus culture. "Close examination of *Life*," Kozol continues, "reveals that the news not only reproduces social values but privileges certain values at the expense of others."[340] *Life*'s focus on family life in the homes of the astronauts was an important part of the magazine's project of cultivating an ideal image of American life, a focus that necessitated intimate access even as the astronauts' families enjoyed the protection from other media offered by the magazine's exclusive contract. Kozol argues that "news coverage of some of the most critical issues facing Americans in the postwar period relied on a domestic iconography that blurred the boundaries between public and private spheres and shaped national identity in the process." This argument is especially useful in understanding how *Life*'s coverage of astronaut families relied on

338 Doss, *Looking at* Life *Magazine*, 11.
339 Wendy Kozol, Life's America: Family and Nation in Postwar Photojournalism (Temple University Press, 1994): 5.
340 Ibid., 6.

these intimate images of family life made very public.[341]

Life and America's Astronauts

The Mercury 7 astronauts signed their contract with *Life* in the late summer of 1959, just a few months after their selection had been made public with a press conference in April of that year.[342] The contract gave *Life* with exclusive access to astronauts and their families for coverage of their personal experiences. It provided the original seven Mercury astronauts with additional income of about $25,000 per year for each of them as well as life insurance policies.[343] The contract was renewed as more astronauts joined NASA through the 1960s. The extra income supplemented the astronauts' military grade pay, and the life insurance policies were crucial in that other insurance companies considered the job of an astronaut to be far too risky to make insuring them a good investment. The magazine's coverage would focus on the home life of the astronauts, but preparing for the dangers they faced at work were an important part of the financial agreement they made with the magazine.

In negotiations with NASA about the scope of their coverage, *Life* editors came to understand that their coverage would only remain exclusive if it was focused on the personal lives of the astronauts and their families. In accordance with the Space Act that created NASA, the agency was obligated to freely provide as much information about the space program to the public as possible. In 1959, NASA ceded its responsibility for documenting and conveying the personal stories of individual

341 Ibid.
342 NASA Release no. 59-1113, April 9, 1959.
343 Dave Meerman Scott and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (The MIT Press, 2014): 18.

astronauts to *Life* magazine. In a sense, this exclusive contract with the popular weekly enabled NASA to focus its own documentation efforts on the purely technical. The first head of NASA Public Relations, Walter Bonney, who presided at the Mercury press conference, understood the arrangement "to separate the personal lives of the astronauts, who would inevitably become celebrities, from NASA's public affairs duty to provide information to the press and the public. 'The distinction between publicity and public information must be kept
constantly in mind.'"[344] The deal did not sit well with other members of the press who objected to an effective monopoly on certain kinds of space program coverage, but it suited NASA's Public Affairs interests quite well in that it created a separation between the information role of the agency and the much more subjective nature of covering personal stories.[345]

The astronauts and their families saw the contract as a way to limit press access. Ironically, it was only by allowing *Life* such privileged and intimate access that the astronaut families could protect their privacy and maintain the integrity and sanctity of the family home. The result of that exclusivity and privacy was that *Life* was able to construct a totalizing narrative of the experience of astronaut families, one that was carefully designed to affirm mainstream middle-class values of domestic safety and order against which a lasting image of a space program that occupied male-dominated spaces of danger and chaos was created.

344 Ibid.
345 See Kristen Amanda Starr, "NASA's Hidden Power: NACA/NASA Public Relations and the Cold War, 1954-1967 (PhD Dissertation, Auburn University, 2008).

Life began its exclusive coverage of astronauts and their families with a feature headlined "The Astronauts—Ready to Make History."[346] In addition to an introduction by the *Life* editorial staff, each astronaut had a byline in which he described his selection, early training, and thoughts about the future. "With this issue," wrote the editors, "*Life* begins an exclusive series that will chronicle their magnificent undertaking from start to stirring conclusion. [...] The series will continue until the epochal goal is achieved—when an Astronaut is successfully recovered after orbiting the world."[347] This issue introduced the reader to *Life's* intimate reporting and candid, documentary-style photographs of the space program.

In introducing the astronauts, the *Life* editors noted that "In spite of their extraordinary qualifications the Astronauts have many of the preoccupations, and even the small weaknesses, of more ordinary men. [...] They are concerned about the condition of the grass in their yards and proper schooling for their children."[348] By assuring the reader that even astronauts are concerned about their lawns, *Life* grounded them and their work in a familiar idea of place, the suburban home with its many material concerns and maintenances. Home, or at least an archetypal white, American middle-class idea of home, was the place that anchored the inherent placelessness of space travel and connected the spaceman to his more ordinary peers. House and home, the ideal place of the American family, was part of the fabric of what *Life* imagined was a continuous, homogenous middle class of which, the magazine stressed, even astronauts were a part.

346 "The Astronauts--Ready to Make History." *Life* (September 14, 1959) 26-43
347 Ibid., 26.
348 Ibid., 27.

Immediately following the first exclusive story on the astronauts, *Life* published similar individual narratives for each of the seven wives a week later. In "Seven Brave Women Behind the Astronauts," the domestic concerns of the wives were given precedence. In the wives' descriptions of their new homes, their furniture, and the activities of their children, the reader could be assured that if any change was wrought on their families by their husbands' selection to the program, it was negligible or a net positive.[349]

Marjorie Slayton, for example, set the potential complications of her husband's new occupation and fame against the challenges of placemaking in their new home in Virginia, a distinctly material experience that takes precedence over fame and existential worry. While home was often invoked in this coverage as a metaphorical space created by the presence of a family, it was also constructed in these narratives as remarkably physical:

> This Astronaut, after all, is still my husband, and we have to try to live a normal life. Right now we are so involved in settling into our new home that there really wouldn't be time to act differently, even if we wanted to. I don't have the furniture for the living room yet. The drapes aren't up. And Don is rushing to finish building a fence out back to keep little Kent from tumbling into the pond behind the house. If I worry about anything, it's about little things like when he will get around to fixing the closet door and whether he will ever have any luck fishing.[350]

The narratives by the individual wives, likely ghostwritten in whole or in part from interviews or at least heavily edited, conformed to *Life's* prescriptive construction of an ideal modern middle-class life that included home ownership and conspicuous consumerism. Slayton's narrative was meant to assure readers that her concerns were

349 "Seven Brave Women Behind the Astronauts," *Life* (September 21, 1959) 142-163. This pagination includes the editorial segment and all the individual narratives.
350 Marjorie Slayton, "I Have Never Been Nervous," *Life* (September 21, 1959) 163.

also their concerns and that she was not troubled by her husband's new posting to any degree that would cause her to neglect the duties and responsibilities of a good housewife. In other words, it was necessary to *Life*'s construction of the perfect middle-class American heroes to show that the astronauts and their families were concerned with and connected to the idea of the suburban family home. Yet it was also necessary to construct a gendered family order to manage the distracting and worrisome aspects of the home while they performed their astronautical labors.

When Gus Grissom, John Glenn, and Alan Shepard were selected out of the larger group for the first three missions (the specific order of their flights was not yet known), *Life* ran another lush feature on the three astronauts and their families. Presented as "The First Astronaut Team," the feature was headlined not by official NASA portraits of images of the astronauts training but a group shot of the three families enjoying the beach together.[351] The feature was written by Loudon Wainwright and illustrated with photographs by Ralph Morse. Much of the piece was devoted to talk of family and home life. Wainwright explained that the Glenn family did not make the move to a home close to Langley Air Force Base when John was selected to the program. Instead, Glenn

> chose keep them in the comfortable house he own outside Washington and took a room for himself in the bachelor officers' quarters at Langley. As one good reason for this separation in which he sees his family only on weekends, Glenn says that he wanted to keep his children settled in the good school they were already attending. There is another reason: Glenn felt it would be best for his training if he were to have no distractions during the working week.[352]

351 "The Chosen Three for First Space Ride, *Life* (March 3, 1961) 24-31. I have written before about the image of the astronaut body in this issue. See Anna Reser, "The Body of the Astronaut as a Body of Images: The Visuality of the American Space Program, 1959-1969." (Master's Thesis, University of Oklahoma, 2015).
352 Ibid., 26.

Glenn's wife Annie stressed also that Glenn should be spared the practical concerns of home life during his training and that if he stayed on base, he "doesn't have to the worries of when to order more wood or when to fix the front door."[353]

While *Life*'s coverage of the astronauts' families was well in line with its own values and ideals for middle-class America, the sometimes saccharine coverage did not always sit well with readers. Following the lengthy coverage of the wives' individual narratives, one reader wrote to the editor that "all that 'togetherness' is enough to send anyone into the wild blue yonder."[354] Another letter expressed concern that *Life* was spending too much time on "sentimental" articles when there was not even a completed spacecraft or functioning rocket yet available for them to fly. "We are still likely to be admiring the Astronauts and their families long after the Russians have orbited several unsentimental human Sputniks."[355] Impatience with the intense focus on the domestic narratives of the space program was not limited to *Life* readers. For example, an article about television coverage of Gemini flights reported that the broadcasts were praised by *Science* magazine for prioritizing technical accuracy over "saccharine family interviews."[356] But the public's appetite for news about the astronauts and their families was quite robust, and *Life*'s coverage would only become more florid and dramatic. It was in the coverage of the launches, framed as tense and emotional vigils in their family living rooms, that *Life* most fully articulated the importance of the home as a specific place in the story of the space program. I examine the "vigils" of the wives of the first three American men to

353 Ibid.,
354 "Letters to the Editor," *Life* (October 12, 1959) 16.
355 Ibid.
356 Evert Clark, "Science Magazine Hails Coverage of Space Feats," *The New York Times*, September 20, 1965.

fly in space and show how the enduring image of these long watches shaped the image of home and family life for astronauts against that of the dangerous and unpredictable places of the space program.

"The Time That Grew Too Long": Louise Shepard and Betty Grissom

When Alan Shepard became the first American to fly in space, *Life* magazine was on hand at the Shepard family home in Virginia Beach. This was where the writer, photographer, and even Louise Shepard herself constructed the narrative — and the trope — of the vigil of the astronaut wife. Louise's piece, "The Spaceman's Wife: 'Alan was in his right place,'" was published the week before Shepard's own story of his flight, making the experience of his family among the first narratives of the event to which the American public was exposed. The title of the piece itself invited the reader to consider how the new profession and identity of "astronaut" was constructed through and against specific ideas of place, both the workplace of the space program and the home where he necessarily spent so much time away.

Louise Shepard was actually at Cape Canaveral some time before the mission began, returning home on Alan's recommendation just prior to the launch. She explained,

> He was convinced that it would be better for me and the family if I waited out the flight in Virginia Beach. He would keep me closely posted by phone, and I would be away from the pressures of the great build-up at the Cape. At first I had wanted to be near him when the shot was fired, but I decided to play it his way.[357]

Louise herself framed the distinction between home and the places of the space program as one between safety and harm, between the calm of the ordered and

357 Louise Shepard, "The Spaceman's Wife: 'Alan was in his right place,'" *Life* (May 12, 1961) 28.

secluded household and the chaos and stress of the Cape.

Louise had a number of occasions to rehearse and refine the ritual of the launch day vigil, as there were scrubs, holds, and delays of her husband's mission. The day before the launch was initially scheduled, she wrote that she "tried to think about things *I* had to do, not about the preparations that Alan was beginning to make," so she carried on with a typical Monday routine that included shopping and preparing music selections for church.[358] With the launch moved up to Friday and the news that Alan would be the first to fly finally made public, the family busied themselves with trying to answer a flood of letters and wires. Louise described the day of the actual launch, writing, "The street outside was lined with cars and people and there was a group of about 50 reporters and photographers on the lawn."[359]

The coverage of Shepard's launch established some of the important tropes of the wife's vigil, but it was conservatively illustrated in comparison with later coverage. The story only contained two photographs: one of the family praying around the dinner table and a close up of Louise's smiling face as she received good news on the telephone. A hallmark of later coverage of this type, images of the family huddled around the television were absent from Louise's piece. Part of the reason for the short length of the piece and the limited photographs in a photo weekly may have been technical, for Shepard's flight lasted only 15 minutes. Later flights in Project Mercury lasted much longer, and Gemini and Apollo flights stretched a tense day into multiple days, up to

358 Ibid.
359 Ibid., 29.

nearly two weeks.

Next to fly in Project Mercury was Virgil “Gus” Grissom. His wife Betty also remained at home for the launch, and her narrative in *Life*, published under the headline “Nothing So Important as ‘I Love You,’” was considerably shorter than Shepard’s and contained only one photograph of Betty, rubbing her eye, sitting with her legs balanced on the narrow heels of her shoes. Betty was joined in her vigil, as would become common, by several of the other wives of the astronauts. She said: “The girls and I went into the den and sat around the television drinking coffee.”[360]

As with Shepard’s flights, a number of delays and holds meant that families were often subjected to the buildup of tension caused by the launch — and the letdown of a scrub or delay — more than once. The wives generally related that they filled this time and eased tension by performing various routine tasks such as tidying or cooking. Betty reported,

> When a slight delay was announced, I went to the kitchen and put some eggs on to boil. Next thing I knew Marge was calling me back. The countdown had resumed. At T-minus-five I thought about the eggs that were supposed to be soft-boiled and ran to the kitchen. They were hard by this time and I ran back to the television set.[361]

Grissom’s recovery was much more troubled than Shepard’s. In the end, the capsule was swamped with water and sank, a significant loss of data for mission planners and a source of deep embarrassment for Grissom. Betty expressed the hope that the loss was not Gus’ fault. She then closed her narrative of the day with an oddly specific assertion

360 Betty Grissom, “Nothing So Important as ‘I Love You,’” *Life* (July 28, 1961) 29.
361 Ibid.

of her duties in this whole affair, writing that when she spoke to her husband on the telephone after the mission "he told me that the motel laundry had lost two pairs of his slacks and he needed shirts, so I started thinking about what I should take down to the Cape for him."[362] Whenever the wives of astronauts expressed interest in, knowledge of, or general concern about the work their husbands do, the danger they face, or their performance on the job, *Life* always framed such concerns as fleeting or secondary to the more immediate domestic duties that the wives were expected to undertake. In this way, *Life* consistently constructed a boundary between the extraordinary spaces of spaceflight and that of ordinary home life and domesticity.

The Long Watch: Annie Glenn and the Orbital Vigil

The wife's vigil reached its dramatic height with *Life's* coverage of Annie Glenn's lookout for what was, to that point, the most dramatic event in the American space program. Her husband John Glenn would be the first American to orbit the earth, and *Life*'s coverage of the family's experience rated a headline on the cover of the magazine and 16 pages of narrative and photographs, including color images. Compared to the short pieces for Shepard and Grissom, each illustrated with minimal black and white images, the feature on the Glenn family was a print melodrama that even echoed a cinematic or televisual experience with its use of sequential photographs of Annie Glenn.[363] Unlike the two previous vigil pieces for Shepard and Grissom, the Glenn piece was written by the

362 Ibid.
363 *Life* is of course notorious for its use, and perhaps abuse, of sequential still images. Most famously, the magazine bought the Zapruder film and published stills from it out of sequence, which media scholars have argued contributed significantly to mainstream acceptance of a particular version of the events of the Kennedy assassination. See Doss, *Looking at Life Magazine*, 16.

editorial staff and Loudon Wainwright, instead of being presented as a narrative in the wife's own words.[364] The Glenn family was photographed by Michael Rougier. As the ultimate goal of Project Mercury, Glenn's orbital flight symbolized the United States finally catching up to the Soviet Union in the space race. Wainwright opened the story of the Glenn family's "long watch" with a not-particularly-subtle anecdote about the potential for a family to be undone by the risk of the astronaut profession:

> What had troubled Annie Glenn's sleep was a bizarre domestic concern. A week earlier the city of Roanoke, Va., had sent her husband a painted wooden valentine with plastic roses. It was 12 feet tall, 16 feet wide and weighed 600 pounds. It was now propped up against a wall in the carport: the cold night had been windy, and Annie Glenn had awakened repeatedly with fears that the Valentine would blow over and smash into the station wagon.[365]

Throughout the piece, Wainwright opposed the Glenn family home, and the belongings and people in it, with the harshness and peril of astronaut work. The piece gave the reader a miniature tour of the Glenn home, detailing along the way the objects and artifacts that anchored John's presence in the home: a Marine Corps ceremonial sword in the living room and a collection of Glenn's signature patterned bow-ties in the bedroom closet. The passage served both to reassure the reader of Glenn's place and prominence in his own home even in his physical absence and to showcase the extraordinary access granted to *Life* by the family.[366]

This concern with domestic order was observed by *Life* at all different scales. As in other pieces, the Glenn feature also mentioned where the family took its meals, noting that they "did not sit down together for breakfast. They took their food into the living

364 For an account of Wainwright's experience covering the astronauts for *Life*, see Loudon Wainwright, *The Great American Magazine*: *An Inside History of* Life (Alfred A. Knopf, 1986).
365 Loudon Wainwright, "For those who cared most, the long watch at home," *Life* (March 2, 1962) 29.
366 Ibid., 28.

room and sat where they could watch the television."[367] Annie, the ever perfect hostess, prepared food for the family and friends that shared her vigil.[368] When the weather broke in Cape Canaveral and the family got word that the launch would go ahead, Wainwright reported, "The women, including Annie Glenn herself, dark eyes huge in her pale face, began to clean up the breakfast dishes. Theirs was an honored female ritual of getting ready: whatever was going to happen, the house must be straight."[369] As the moment of launch approached, Wainwright used the familiar surrounds of a home, any home, to generate tension for the reader and to highlight the contrast between the simplicity and banality of the domestic setting in which such a cosmic event was observed. In the final moments before liftoff, Wainwright said, "The volume on two of the television sets was turned down and over the sound of the voice of the lone commentator could be heard the humming of a kettle coming to a boil in the kitchen."[370] Small moments like these hinted at the disruption to normalcy that astronaut families endured without implying that such disruptions were permanently damaging to the expected domestic order, striking a balance between drama and reassurance for the reader. Wainwright stressed throughout that Annie's proper role in this drama was to maintain the integrity of both the social and cultural function of the home and its material concerns.

The coverage of Annie and the family for John's flight was substantially longer and more heavily illustrated than that of the previous two Mercury flights. It was also relayed by a magazine writer, whereas the first two were presented as accounts in the wives' own

367 Ibid., 29,31.
368 Ibid., 29. See also Katherine Parkin, *Food is Love: Advertising and Gender Roles in Modern America* (University of Pennsylvania Press, 2007).
369 Ibid., 31.
370 Ibid.

words, even if they were probably not completely written by Louise Shepard and Betty Grissom. The overall effect elevated Annie's narrative above the inherent drama of Glenn's mission, and it became a universal fable about the plight of the astronaut's wife. This fable and the ritual it described were used by *Life* to delineate and consecrate the protected space of the astronaut's home, a material and physical fortress, and set it against the danger and chaos of the work of going to space. From the smoke-and-men filled rooms of MSC and the Cape to the confines of the capsule itself, the places of spaceflight were constructed as anti-home places that were bereft of the security and comfort of the figure of the dutiful wife and, to a lesser extent, children and extended family. While American families everywhere lived under the shadow of nuclear threat, the families of astronauts fortified their homes against the potential of much more personal tragedy.

The Virtual Vigil: Rene Carpenter at Cape Canaveral

If the story of Annie's Glenn's vigil refined and codified the hallmarks of the trope, the story that appeared in *Life* magazine documenting Rene Carpenter's experience made plain the mechanisms through which the magazine constructed it. Rene was the first astronaut spouse to view the launch of her husband's flight from somewhere outside the confines her own home. *Life* rented the family a beach house on Cape Canaveral, and instead of watching the rocket rise into the air on television, she and her children ran out onto the beach to see it disappear into the blue with their own eyes. But *Life*'s coverage was almost identical to that for Louise Shepard and Betty Grissom. And most importantly, *Life* magazine was able to maintain the illusion that Rene and her children

were at home, safely ensconced in their proper place in a rental house instead of a hotel room or sitting in viewing stands where other press would have access to and control over the narrative of her vigil. The aesthetic and narrative consistency of Carpenter's vigil with those of the previous three wives demonstrated the importance of visualizing astronaut families inside the familiar confines of the home for which any house might suitably stand in.

Once Rene had made the decision to take her children to the Cape for the launch, both she and John Powers, NASA's Public Affairs officer, knew that there would be some logistical hurdles to overcome. The most pressing was that, had they remained at home, she could have simply holed up in her house to avoid the press frenzy that astronaut wives had come to expect on mission days. Protected by the physical enclave of her home and the contractual barrier of *Life*'s exclusive access meant she was under no obligation to talk to anyone but the *Life* writer and photographer. Rene would have had much more control over the sacred space of "the astronaut's home" if she had remained at her home. At the Cape, *Life* would step in to create the place of the astronaut home and protect it — and their interests in exclusivity — from the prying eyes of other press.

Perhaps because she was a writer herself, Rene's narrative focused more on situating her own ordeal watching the launch within the larger spatial relations that had come to define her life as an astronaut's wife. Rene made it clear that she was the one who had ultimately made the call to go to the Cape. She explained her choice explicitly in terms that contrasted the male-dominated places of the space program with what her

presence would mean to her husband:

> He [Scott] wanted us there, but more to the point, I wanted to be there badly. In that male atmosphere of Hangar S, Scott lived wedded to the capsule, taken over by hundreds of chain-smoking, coffee-drinking men who with a quiet possessiveness would work with him, launch him and pray for his recovery. Only when their job was completed—successfully—would he be returned to me.[371]

Both the vivid description of Hangar S (the building at the Cape where astronauts readied for their missions) and the language Rene used to suggest a metaphorical infidelity on her husband's part with regard to his work demonstrated the threat to domestic order that spaceflight represented.

The magazine rented a beach house on Cape Canaveral with a view of the launch complex. Some accounts mention that there was even a backup "*Life* house" in case other press discovered the location of the first house.[372] Once she and her children arrived, they would be free to play out the ritual of the vigil in a comfortable, domestic setting that stood in for the Carpenters' own home. But getting to the beach house was another matter entirely, and it involved the children hiding on the floorboards to elude the press camped out on bridges and causeways looking for a mother with kids in the car.

Safe in the beach house, Rene and her family actually watched a good part of the launch on TV, as the other wives had, before going out the back door to see Scott's Atlas rocket rising into the sky. But the *Life* story nevertheless hits all the characteristic

371 Rene Carpenter, "...and his wife living through 'the time that grew too long'," *Life* (June 1, 1962) 29.
372 Wolfe, *The Right Stuff*, 298.

beats of Annie Glenn's vigil narrative.[373] Carpenter marked time in her memory through the performance of domestic tasks, noting that even in the last few moments before the launch, she remembered "hurrying between the dining room and the kitchen and emptying soggy bowls of cereal into the sink."[374] While waiting for news of the completion of the long mission, something the Shepard and Grissom families did not have to endure, Carpenter "plumped pillows, aimlessly straightening the coffee table and waited with everyone else."[375] Even in a rented beach house, *Life* portrayed Carpenter as a dutiful wife who enacted the domestic rituals and tasks that mark a place as home and signal that Carpenter herself, even in a moment of incredible stress, would busy herself with the care of the home, even if it was only temporary.

The "Vigil" as Model: Newspaper Coverage

The importance of the exclusivity of *Life*'s contract with the astronauts and their families is hard to overstate, not least of all in terms of how it affected other media coverage of those same subjects. While its access made *Life* the primary document for understanding the role of the wife and the home in the mythology of the astronaut, other media reinforced this image despite having much less direct contact with their subjects. National newspaper coverage made the best of this limited access even though they were reduced to camping out on astronaut families' lawns with other magazines and television. The resulting stories lacked the intimate detail of those in *Life* but, nevertheless, mirror the same concerns for the materiality of the domestic side of astronaut life that *Life* had injected into the "vigil" style of coverage.

373 Wainwright, *The Great American Magazine*, 265.
374 Carpenter, "...and his wife." 30.
375 Ibid., 33.

Newspapers introduced the astronauts and their wives in group profiles, just as *Life* did. In 1960, the *Chicago Daily Tribune* ran an illustrated feature on the wives that opened with an imagining of what the vigil of the wife of the first astronaut selected to fly would look like. A cheerful group photo of the women contrasted with a dramatic lede, which read, "[s]oon one of seven women will spend the most anxious hours of her life waiting to hear whether her husband will return to her and their children or become a tragic sacrifice to the space age."[376] The piece reported that even though "[n]one had even been briefed on the role she should play as an astronaut's wife," each appeared to be well prepared by their lives as military wives.[377] Betty Grissom, for instance, reported that '"[l]ife is more exciting but there are the same old problems' when asked about if her new role had changed her life."[378] For Louise Shepard, being a military wife provided a script for the new role. If he was chosen to fly first, Louise would not be present for the launch, she said, but would meet her husband Alan afterward as she always had when he returned from being at sea as a Navy officer.[379]

Another article written about the same event, a luncheon with the Officers' Wives Club at Andrews Air Force Base, also mentioned that the women had "never been briefed by their husbands' bosses on what the role of astronaut's wife should be."[380] The lede implied that some of the astronauts' wives would like to go to space as well, but then

376 R.P. Nordstrum and Dick LaCoste, "Our Spacemen's Wives Wait—Confidently," *Chicago Daily Tribune* (October 2, 1960): B8.
377 Ibid., B9.
378 Ibid.
379 Ibid.
380 Winzola McLendon, "Astronauts' Wives Would Be Out of This World, Too," *The Washington Post* (January 20, 1960).

suggested that wives shielding their husbands from temptation was part of that role. "Trudy Cooper and Louise Shepard are the wives who'd like to go along with their husbands into space. 'I'd rather be going with him than have someone else go,' said Trudy when asked if she'd heard the Space Agency was looking for female astronauts."[381]

True to her word, Louise Shepard did not attend the launch of her husband's mission to be the first American in space, but she instead watched from her home. While *Life* magazine captured the whole event from behind closed doors, other media were forced to source their stories from the front lawn of the Shepard home in Virginia Beach. This spatial distinction was evident both in the way that other media used detail about the astronauts' homes and property to invoke something of the immediacy that *Life's* coverage had and in the way it limited what newspaper reporters could actually report on. A piece about Louise's vigil in *The Washington Post* began at the end when she emerged from her home after the successful launch "and stepped out on the porch of her ranch-style home today to say 'It's just wonderful. It's beautiful...just wonderful.'"[382] The piece did not have a byline and was sourced "from news dispatches," but it still attempted to evoke some of the atmosphere and intimacy that *Life* created just by virtue of being in the Shepard home by reporting details about the architectural style of the house, Louise's outfit, and even where she stood to address the press.

The experience of John Glenn's family watching his first orbital flight from home was

381 Ibid.
382 "'Beautiful,' Says Wife of First Astronaut," *The Washington Post* (May 6, 1961).

covered by *Life* in grand fashion and at great length. Newspaper coverage sought to do the same, necessarily with fewer intriguing details such as descriptions of astronaut bedrooms. *The Washington Post* was even able to spin a kind of vigil narrative out of a brief press conference in which Annie reacted to the news that her husband would make the first orbital flight, holding "a press conference [...] on the front porch of their contemporary, rambling brick home in the wooded Williamsburg section of Arlington."[383] The reader learned in the piece that John was at the Cape, and his family was waiting alone for him at their home in Virginia with fingers crossed that he would either be home for Christmas, or "watching him hurtle into space on television that day."[384] John Glenn actually launched two months later on February 20, and Annie did end up watching from home. Along with a host of other media outlets, *The Los Angeles Times* stood watch in front of the Glenn home while "[t]he Glenns spent the day in their home with friends and neighbors. Tidbits of what went on inside were provided by those who came outside and talked to reporters and by Ford Eastman, a spokesman for the National Aeronautics and Space Administration."[385] Compared to the winkingly intimate detail in the Wainwright article, which allowed the reader to peer into the Glenn's *bedroom*, the tidbits of *The Los Angeles Times*' piece that cover the Glenn's "modest red brick and redwood suburban home" and a fire in the living room fireplace felt particularly thin.

The ritual of the wife's vigil made the trip from Virginia to Texas along with the astronauts and their families as they moved into new suburban developments near MSC. In 1962, Walter Schirra made his Project Mercury flight in October, and his wife

383 Sue Cronk, "Astronaut's Wife Grounded Big Secret," *The Washington Post* (December 1, 1961).
384 Ibid.
385 William MacDougall, "'Our Proudest Day,' Says Wife After Tense 10 Hours," *Los Angeles Times* (February 21, 1962).

Jo conducted her vigil "in the den of the new home being built in an 'astronaut district' in Seabrook [Texas] where the American space families have been settling down for duty at the manned spacecraft center [sic] in nearby Houston."[386] Once settled in this "astronaut district" and then joined by members and families of subsequent astronaut classes, the individual narratives of the families of astronauts began to take on a more collective tone. While other wives and astronauts had often kept vigil with the family of a astronaut who was on a mission, in Texas they often lived mere steps from one another and formed several close-knit neighborhoods in the Clear Lake area.

In 1963, a *Chicago Tribune* ran a piece about the vigil of Trudy Cooper, whose husband Gordon's mission was more than a day in length. The narrative was accompanied by images that made it clear the remove at which journalists outside of the *Life* sphere of access had to operate. The first page of the story was anchored by a large photograph of other wives of astronauts who had arrived to keep Trudy company, showing the women leaving the Cooper home later that day and getting into a convertible car. Typeset labels bearing the names of the pictured women hovered over each of their heads with the caption:

> The wives of six astronauts leaving the L. Gordon Cooper home near Houston, Tex., yesterday after visiting with Mrs. Cooper, who remained in seclusion inside her house while her husband was orbiting the earth. Five of the women are visible, while Mrs. Louise Shepard, seated in the car, is concealed by glare on [sic] windshield.[387]

Not did the image not include Trudy Cooper, whom the piece was about, the distance at

386 "All Is 'Perfect,' Says Astronaut's Wife," *The Washington post, Times Herald* (October 5, 1962).
387 "Hopes of Family and Friends Ride with Astronaut, *Chicago Tribune* (May 16, 1963).

which the photograph was shot and the labels added later for clarity gave the image the feeling of an unwelcome paparazzi photograph.

The Vigil Endures: The Long Watch of *Apollo 13*

The image of space-age domesticity that *Life* created for the astronauts and their families proved to be remarkably durable. Counternarratives such as the salacious wife-swapping story in *The Washington Post* have not been popular in retellings and adaptations of stories about spaceflight in the 1960s. Rather, the tense vigil of the astronaut's wife and family and the moral messages about the integrity of the home and marriage and idealized American life have remained deep wells of drama for storytelling about space, particularly in film. Director Ron Howard's 1995 film *Apollo 13* takes the vigil as its B plot, following Marilyn Lovell, the wife of mission commander Jim Lovell, as she waits out his disastrous flight to the moon in the spring of 1970. The fact that Apollo 13, of all human space missions from the 1960s, was chosen as the subject of this drama illustrates the importance of danger to the construction of the image of the wife's vigil. Other missions had faced varying degrees of danger, but the aborted landing of Apollo 13 and its harrowing journey back to earth makes for a more intense experience for Marilyn and a more high-stakes narrative for audiences.

Early in the film, Marilyn Lovell (Kathleen Quinlan) while on her way to an event with her husband, American astronaut Jim Lovell (Tom Hanks), makes a startling confession. Without looking at Jim, she says "I'm thinking about...not coming to the launch." Jim is stunned, replying only with a pointed "huh." "The kids need me at home," Marilyn insists.

The scene foreshadows Marilyn's anxious vigil as she waits at home with family and friends through the dangerous mission. Marilyn makes a few more excuses, all involving domestic concerns such as her responsibility to care for Jim's mother and the experiences of other wives who have "not done three." (Jim Lovell was the most experienced American astronaut at the time of Apollo 13). Finally, she hits on the real reason that she does not want to go to the launch, sighing "I just don't think I can go through all of that."[388]

In the film and in the real events it depicts, Marilyn Lovell does make the trek, like Rene Carpenter before her, to Cape Canaveral to see the launch. The rest of the film switches between the perilous flight of Apollo 13 and Marilyn Lovell's extended vigil at home in Houston. Marilyn waits with friends and family, watches television news coverage of the mission, consoles her children, and defends her home from the encroaching press that have gathered on her lawn. All of the patterns and tropes established by *Life's* coverage of the early Mercury flights are used in the film to convey the same sense of drama and anticipation as well as the same sharp division between the dangers of spaceflight and the safety of home.

When the reporters on the lawn relay a request to Marilyn to set up a transmitter outside, she angrily informs the NASA Public Affairs officer assigned to the household that they should do no such thing and that "if they have a problem with that, they can take it up with my husband. He'll be home on *Friday*." The line establishes Marilyn's growing impatience with the gathering press and underlines what their presence

388 *Apollo 13*, 1995. Dir. Ron Howard.

suggests about how much danger her husband might really be in. Marilyn's defiant assertion is an attempt to minimize that danger, her tone an attempt to suggest that Jim is, perhaps, merely on a business trip. As in the *Life* magazine profiles of waiting wives, it is up to Marilyn to shore up her home against invasive media and the threat of her husband's death by using an appeal to Jim's authority as the man of the house, even in the face of his absence.

Despite the celebrated verisimilitude of the film, audiences do not see *Life* magazine writers or photographers in the Lovell home during the vigil. In Marilyn's battle to maintain her privacy, the invading press are shown camped out on her lawn, not inside executing the terms of the contract.[389] Film scholar Dario Llinares writes about how the technical accuracy of the film has caused it to become its own kind of historical document, which the filmmakers accomplished by reproducing Apollo Mission Control in minute detail and filming spacecraft scenes in the "Vomit Comet," an aircraft-based microgravity simulator, to create realistic microgravity conditions.[390] The film completely elides the *Life* staffers, conferring a similar status on *Life*'s real life coverage of the vigil in the Lovell house. The film treats *Life* as a historical source document from which parts of the film were adapted rather than as part of the story itself. The film replaces *Life's* camera with its own, giving audiences an even more intimate look at the events than the magazine ever could have. The film attempts to foreclose on a narrative reading, pretending to depict total candid objectivity in much the same way *Life's* coverage had done.

389 See "The Joyous Triumph of Apollo 13," *Life* (April 24, 1970): 28-36.
390 Llinares, "Idealized Heroes," 164

The film's elision of *Life's* physical presence in the homes of astronauts is one that naturalizes the trope of the vigil and obscures the circumstances of its construction. Editors of the magazine, in planning their long-term coverage of astronaut families, consciously centered their reporting on the intimate, domestic details of their lives to which no other publications had access. While the exclusivity of the contract provided astronauts and their families with a measure of privacy from other news outlets, they traded it for *Life's* almost unfettered access to their personal lives. Thus, the familiar image of the vigil of the astronaut's wife is only familiar because it was carefully constructed by *Life* and widely circulated to the American public.

Building Dream Homes in the Space Age

The Astronaut Wives Club was published in 2013, and it gave readers an intimate picture of the lives of the women married to America's first astronauts. The book is sourced from interviews with the women and their husbands, which are woven into a roughly chronological narrative that follows the space programs of the 60s and 70s through the experiences of the wives of astronauts. As author Lily Koppel writes in the introduction, "we have heard and seen so much about the technological aspects of the space race, but not enough about the extraordinary day-to-day lives the wives experienced behind the scenes."[391] And while these women faced uncertainties and challenges that were of course wholly unique, Koppel also says that "the astronaut wives were ordinary housewives," and despite being very much in the public eye, they were, as I have argued, still tasked with fulfilling all the expectations Americans had of

391 Koppel, *The Astronaut Wives Club*, xv.

that role. Like Koppel, I argue that the lives of the wives of astronauts are as important to understanding the history of the space program as those of their husbands, and moreover, the images of their lives, widely distributed, contribute significantly to an understanding of the meaning of the places of human spaceflight.

In the early 1960s, as NASA was expanding and building its most famous ground facilities, the image — and reality — of home was in flux for space workers who were taking new jobs and moving across the country to follow the needs of the mission of human spaceflight. For astronauts in particular, the transition from temporary military housing to affluent suburban neighborhoods was one that allowed them to participate in a larger postwar culture of consumerism. Like other American families, the astronauts and their wives and children sought to secure their homes against the corporeal and social threats of the Cold War and to partake of the postwar culture of conspicuous consumerism in building their "dream houses." These places—the individual homes of astronauts, neighborhoods like Timber Cove, and the communities surrounding NASA centers—are as important to understanding the cultural history of the space program as NASA's own facilities. They are, perhaps most importantly, sites whose public image is constructed *against* that of NASA centers, as refuges away from those places and, thus, define their image by comparison. The narrative of the vigil of the astronaut's wife is the central motif of the image of astronaut family life that endured to the end of the twentieth century. These public narratives were not transcriptions of the day-to-day lives of astronauts and their families but carefully constructed dramas, crafted to bolster the clean-cut image of the astronauts and emphasize the responsibility their wives had in

maintaining home and family life in the face of the difficult and dangerous work of spaceflight.

7. Conclusion

It was only about 70 degrees the day I visited Johnson Space Center in November, 2017, but the humidity streaming north from the Gulf of Mexico made the air close and I was sweating by the time my guide and I reached Building 30, where Mission Control is housed. Dr. Jennifer Ross-Nazzal, the JSC historian, met me in the parking lot near the gate to the center, decked out in an orange Houston Astros shirt and bearing a visitor's badge for me. The night before, the Astros had defeated the Los Angeles Dodgers 5-1 in Game 7 to win their first World Series. "It's a good day to be in Houston," Dr. Ross-Nazzal told me as we set off.

Building 30 is one of the most decorative of the clutch of modernist structures built in the early 1960s as the Manned Spacecraft Center. Between two hulking, windowless wings, a breezeway is fronted in glass and shaded by a pre-cast concrete screen of articulated, triangular fans. We slipped into the building and up a set of stairs between public tour groups so that I could get a quiet look at the historic Mission Control. Since its retirement in the mid 1970s, the iconic control room was named an National Historic Landmark and has been sealed off to preserve the space for tourists and enthusiasts. At present, the only way to view the room is through the glass fronted press area behind and above the rows of consoles that were used by the controllers. Inside, it is dark and small, with rows of theater seats upholstered in fading, stained red fabric. Dr. Ross-Nazzal pointed out the shredded covering of a shelf that used to hold telephones for journalists to file stories. Visitors had been tearing off pieces of it as souvenirs.

The control room itself looks much the way I had imagined it. Although there are no overflowing ashtrays or coffee cups or binders full of procedures, the greenish computer consoles and the plaques with mission emblems on the walls all look just right. But the room's age is apparent. Like the rest of the original buildings constructed in the 1960s, Building 30 and historic Mission Control are more than 50 years old, and like many modernist government buildings from the era, making the case for their preservation has been difficult. After all, aside from Mission Control, many of the buildings are offices, whose functions have changed as NASA's mission has changed since the 1960s, and are regarded by many as merely outdated containers, rather than historic monuments.

I would not begrudge the people who work at JSC today new facilities, especially since some of the older buildings now pose health hazards in the form of mold, and are difficult to modify to be accessible to disabled people. But, as I have argued, there is much worth remembering and understanding about NASA's historic facilities and their role in the space programs of the 1960s. The places on *earth* where the space program took place are in many senses more important than those in outer space. It was in the now-moldering office buildings of MSC, and on the launchpads raised above the swampy palmetto landscapes of KSC, that the work of making spaceflight possible took place, and where it became a public spectacle.

Equally important, however, is remembering that in their roles as the most visible of

NASA's ground facilities, MSC and KSC were not fixed, bounded, contained places. As much as I thought at the time that I would need the photographs I made in 2017 of the breezeway of Building 30 or of the terrazzo-tiled walls or door handles cast in the shape of the NASA meatball logo, or a bathroom that Dr. Ross-Nazal told me was at the center of a heated debate between management and the Historic Preservation Officer, it was the larger picture of these places that became most central to my findings. In a way, it was Dr. Ross-Nazzal in her Astros gear that first helped me to understand the sense of place I was looking for on that trip to Houston. This study has identified a number of important places, and senses of place, that came to define the public image of the space program in the 1960s. Beyond the iconic images of the lunar surface, or the ultimately more powerful images of the globe of the earth, images of NASA's activities and facilities in Texas and Florida shaped both the agency's image in the public sphere and in the image of the communities and landscapes that surrounded them. In this sense, for instance, the Astrodome is as important to the image of NASA and MSC in Houston as its own facilities because it was also part of the larger reshaping of the city in the image of technological futurism and economic prosperity to which MSC contributed.

In Houston, the nickname "Space City U.S.A." is a productive object for thinking about the larger scales at which place was created by the American space program. The new images of prosperity and technological futurism that NASA brought to Texas in 1961 seemed to map easily onto the shifting image of the city, retrofitting its wild west iconography with that of the astronaut. Like most such visions of the future, Houston's

new image and all the benefits that came with it were unevenly distributed. As new suburbs were filled with “dream homes” for affluent space workers, the city’s black neighborhoods were left without basic infrastructure and subject to planning policies that disproportionately benefited the wealthier, white areas. With NASA’s arrival, and the influx of aerospace contractors that followed, Houston was transformed from the capital of oil production to a “Sunbelt” city that had been firmly slotted into the military industrial complex of the postwar period.

In Florida, however, the effects of NASA’s presence are more difficult to organize under a tidy moniker. In large part because the closest large city to KSC is 40 miles to the west, the identity of the center experienced more instability in the 1960s than did MSC. The profusion of names for this the area alone is an indication of the complex, overlapping nature of place at KSC. The name “Space Coast” perhaps comes closest to the geographical and conceptual precision of “Space City U.S.A.” but the two places are not fully analogous. Firstly, I have not been able to identify a use of the term “Space Coast” from earlier than 1969, while the identification of Houston as a Space City began almost immediately upon NASA’s announcement of the move. More importantly, it seems that “Space Coast” was a name devised by local businesses and tourism interests in Brevard County to combat the decline of the area that began when facilities were completed in the mid 1960s and was compounded by the federal budget cuts that ended the Apollo program in the early 1970s. “Space City U.S.A.” was a name given to a city that expected to enjoy major intellectual and economic benefits from NASA’s arrival in the 1960s, and “Space Coast” represents an attempt to salvage something of

those benefits that began to decline in the late 1960s and 1970s in Florida. Detailed study of what exactly happened to the communities surrounding KSC as the Apollo program came to an end would serve both the need for a transitional history between Apollo and the space shuttle, and more fully account for NASA's impact on the locations of its centers, both positive and negative.[392]

One way that such a study might account for the negative impacts of NASA's presence in Florida is to analyze in depth and in specificity the kinds of displacement and disruption the agency created during the process of land acquisition in the early 1960s. The National Archives maintains real estate files from this period, documenting each piece of property purchased or condemned by the Army Corps of Engineers in their management of the acquisition process. It is possible that productive oral histories could be conducted with people who lived on Merritt Island and in surrounding areas at the time, and whose homes and farmland were purchased or acquired by eminent domain. Where my findings concern the more abstract process of generating aesthetic and historical justifications for land acquisition and use at KSC, many of which drew on the representational conventions of empire and of American cultural ideas about the value of wilderness, there remains an untold history of families forced to move out of their homes, farmers whose citrus groves were re-leased to them by the government, and communities whose fortunes became intimately —sometimes disastrously — tied to the rise and fall of human spaceflight in the United States.

392 A documentary film from 1979 explores this moment in the history of Brevard County, but it is difficult to find. The film features informal *cinéma vérité* style photography of local residents, including the famous space program reporter Mary Bubb. Ross McElwee and Michel Negroponte, dirs., *Space Coast* (1979). More information about the film is available on McElwee's website: http://rossmcelwee.com/spacecoast.html (Last accessed March 12, 2019).

In addition to the stories of people who lived on and around the land that would become KSC, there remain many under examined groups of people within its boundaries whose work and lives deserve further examination. I have pointed to promising recent studies of women in technology, especially in computing, as a model for recovering the history of women who worked for the space program, at KSC in particular. I caution, however, the impulse to specifically seek out women with jobs that are easily seen as technical or scientific in doing this recovery work at the risk of again overlooking women in technical and scientific workplaces whose work is classified as clerical or supportive. As Jennifer Light showed in her study of women computers, there is a gendered history to the classification of women's labor that relies on dynamics of masculine power and prestige, rather than some objective designation of technical or non-technical work. Thus beyond the stories of genuinely remarkable women scientists and engineers who worked for the space program, there are thousands of women whose labor made human spaceflight possible in the 1960s. These women are not only to be found at NASA, however. More in depth studies of all women workers at the agency are certainly called for, but so are similar studies of those who worked at aerospace and technology companies, such as North American and RCA, who contracted to NASA to build hardware, to operate parts of NASA installations, and to conduct research and development for human spaceflight in the 1960s and beyond.

Broader studies of the cultural history of NASA's management and relationship to industry in the 1960s are also desirable, in that they can further illuminate the currents

of managerial capitalism and defense contracting that gave stability and structure to the military-industrial complex in the postwar era. But there are other angles from which to approach such stories. Much of the research and development work which NASA contracted to aerospace and technology firms reached far beyond the white-collar confines of NASA and corporations to touch on larger flows of culture, and even counterculture. For example, NASA contracted Garrett AiResearch in 1970 to produce a study on habitability for long-duration space missions. Los Angeles artists Robert Irwin and Billy Al Bengston consulted on the study, offering input about the aesthetics of spacecraft interiors and appliances.[393] Irwin in particular was involved at the same time with much more psychedelic projects such as his artistic explorations with sculptor James Turrell on theories of perception and brain wave patterns, some of which they tested inside immersive installations and sensory-deprivation chambers. These intersections of the massive network of defense contracting that NASA built with the art and aesthetics of the 1960s and 1970s indicate that the strict division between mainstream professional culture and the countercultural movements of the period were only surface level in some instances.[394] Irwin and Bengston's status as high-profile members of a very particular art scene in Los Angeles further suggest that analyses of place can also be usefully enlisted to identify and understand such connections.

The broad understanding of place that would enable studies of the intersection of NASA with other currents of American culture also encompasses the more intimate and familiar surrounds of the home. Far from being a tangential or peripheral place in

393 See Anna Reser, "Space Men," *Real Life,* May 18, 2017. https://reallifemag.com/space-men/ (Last accessed March 13, 2019).
394 See also David Kaiser and W. Patrick McCray, *Groovy Science: Knowledge, Innovation, and American Counterculture* (University of Chicago Press, 2016).

relation to the high technology places of spaceflight, the home is integral to their construction. In public depictions of the space program in the 1960s in *Life* magazine, the homes of astronauts, and to a lesser degree other space workers, figured prominently as sites constructed *against* the places of the space program. This opposition of home as a refuge against the danger and unpredictability of spaceflight, is in fact central to the identity of the space centers as high technology, masculine places that excluded and marginalized people who were not men. An image of the space centers as *not home* is as important to the sense of place that each was developing in the 1960s as the technology they housed, the form of their architecture, or their organizational structures. The kind of home these places were not is also explicitly connected to the type of workplaces they were: as mainly white, middle class spaces, the home life that grew in tandem with the space centers reflected specific mainstream cultural ideas about what constituted the good life, a good neighborhood, and the appropriate comportment of a good wife. While commercially-oriented contemporary space programs seem less likely to produce the kinds of national heroes, and wives of national heroes, that I have described, attention should still be paid to the kinds of home life that space work in the 21st century engenders, and what cultural flows and domestic ideologies the new communities of space workers reflect and project.

The Future of Space Places

The world's first enclosed stadium was under construction at the same time as MSC's sleek modernist campus, and now both the Astrodome and Mission Control are sealed off, awaiting decisions about their restoration and future use. I was only able to spend a

few days in Houston, and it was my very first visit to the city. Whatever sense of place I was able to conjure in that short time and in my research about NASA's history in that city is necessarily incomplete because of my lack of familiarity with the area. But in the high desert of New Mexico, where I grew up, there are plenty of space places both old and new, and with which I feel much more natural affinity. Although this study has opened many new areas for analysis at NASA facilities all over the United States, I find myself now most interested in those a bit closer to my home, embedded in a landscape that I know intimately.

In 2012, major construction was completed on a spaceport facility in Southern New Mexico. Located about twenty miles southwest of Truth or Consequences, a town I visited regularly as a child to see my grandparents, Spaceport America was built as a joint project by Virgin Galactic, a private spaceflight corporation, and the State of New Mexico, and is now owned and managed by the New Mexico Spaceport Authority. The site consists of a horseshoe-shaped terminal and runways, with hangar space and sits on about 15 acres of land abutting the San Andres National Wildlife Refuge and the White Sands Missile Range to the west. Writer Ingrid Burrington visited the site in 2018 and wrote about New Mexico's "sad bet" on spaceflight in bringing the spaceport to the desert, and that "[f]or now, the spaceport is a futurist tourist attraction, not an operational harbor to the cosmos."[395] Unlike the KSC, which was built on a site that had already seen numerous rocket launches before construction began, and which grew from a missile range into a tourist destination, Spaceport America seems to have plenty

395 Ingrid Burrington, "New Mexico's Sad Bet on Space Exploration," *The Atlantic* March 2, 2018. Online: https://www.theatlantic.com/technology/archive/2018/03/new-mexicos-sad-bet-on-space-exploration/554243/ (Last accessed March 14, 2019).

of public spectacle but little to do with actual spaceflight.

This is in part, Burrington argues, because the desert is a place for “the future as rehearsal rather than reality.” Like other twentieth-century technologies such as Elon Musk’s Hyperloop or self-driving cars, commercial spaceflight has chosen the deserts of the American Southwest as its preferred testing ground for less than finished projects. I am interested in the more secret and secluded places, and how they link the more well known, public stories of human spaceflight in the 1960s to other technology projects such as nuclear weapons, and also to cultural and artistic currents, like those that spurred the creation of “earthworks” by artists all over the deserts of the Southwest in the 1960s and 1970s. Such artistic interventions share with large scale technological projects an investment in the idea of the desert as empty and ultimately immutable — anything done to the desert can never ultimately outrun its entropy, which will claim and eventually erase it. For example Michael Heizer’s 1970 earthwork *Double Negative,* a 50 foot deep trench dug between the walls of a canyon in Nevada, is predicated in part on the assumption that the desert will recover from the intervention and reabsorb the earthwork in time with no permanent disruption. Similar understandings of the Nevada desert underlie the decision to use it as an underground test site for nuclear weapons, and as a place to store nuclear waste.

Burrington situates the recent history of commercial spaceflight within the history of technology projects that were tested in the desert, most famously the first atomic bomb. The desert was, and remains, a place where for creating “hot and dangerous

machines.” Once such machines emerge from the desert and are incorporated into the palmetto-dotted landscapes of eastern Florida, for instance, they become embedded in the very visible, if not always wildly popular, civilian space program. They are converted from emblems of secrecy into symbols of the American virtues of openness and technological superiority, and become historic public spectacles.

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Appendix: Figures



Figure 1.1 Photograph, NASA K8-998, n.d.; Ad Hoc Committee on Temporary Facilities January-March 1969; Ad Hoc Temporary Facilities, False Cape Data Collection Annex, Archaeological sites; Directorate of Design Engineering, Real Estate Branch 1963-1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

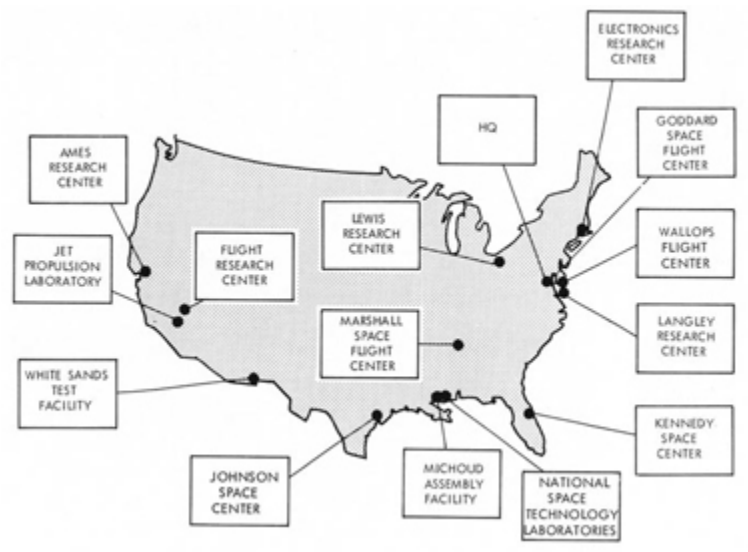


Figure 2.1 Map of NASA Centers and facilities. (Helen T. Wells, Susan H. Whiteley, and Carrie E. Karegeannes, Origin of NASA Names, National Aeronautics and Space Administration, SP-4402, 1976): 136.

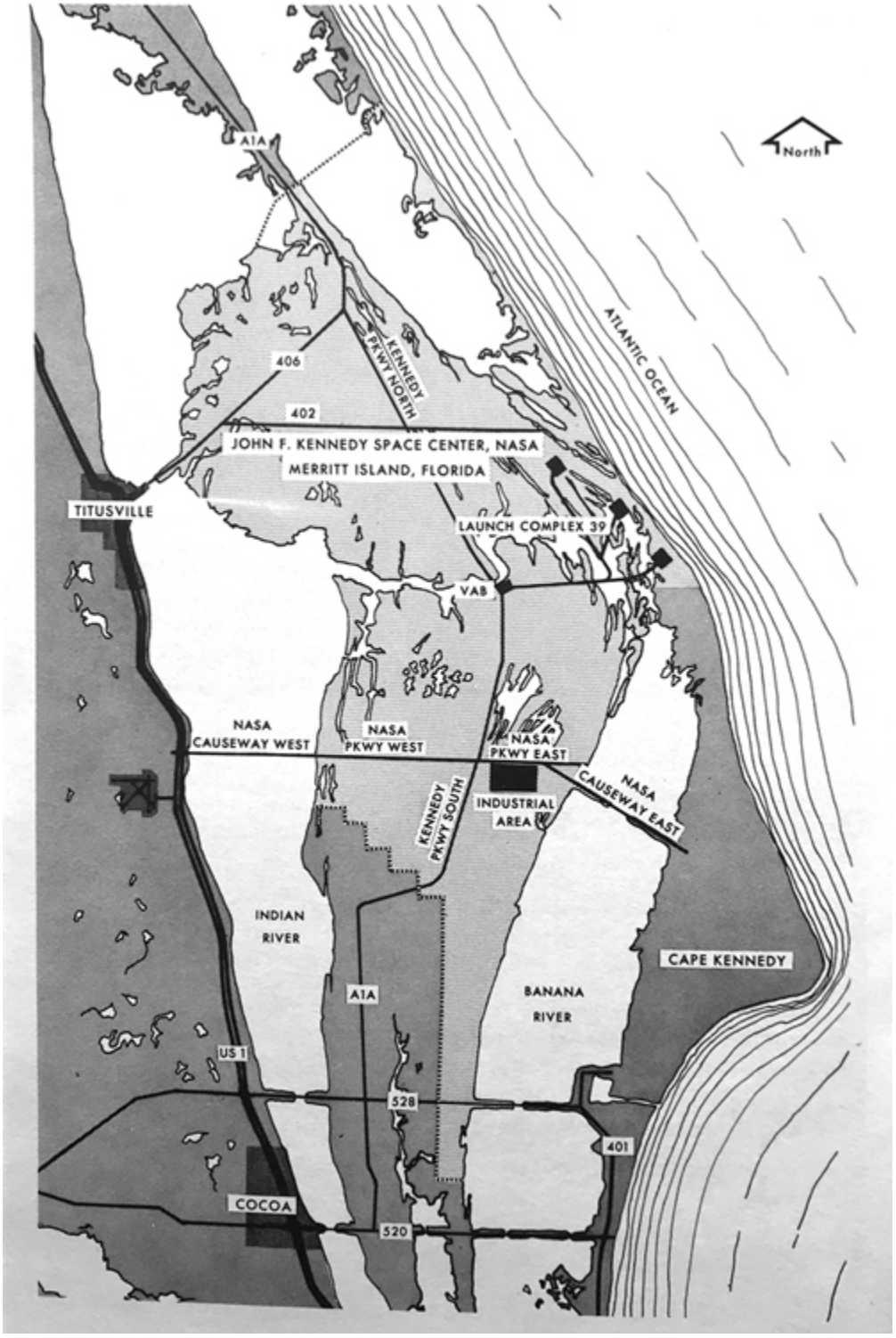


Figure 2.2 Map of Kennedy Space Center, from booklet “Gateway to the Moon,” n.d. Ca. 1963, NASA John. F. Kennedy Space Center. In the collection of the author.



Figure 2.3 Stills from “The NASA Manned Spacecraft Center: A National Resource,” (National Aeronautics and Space Administration, MSC-64-242, 1964).

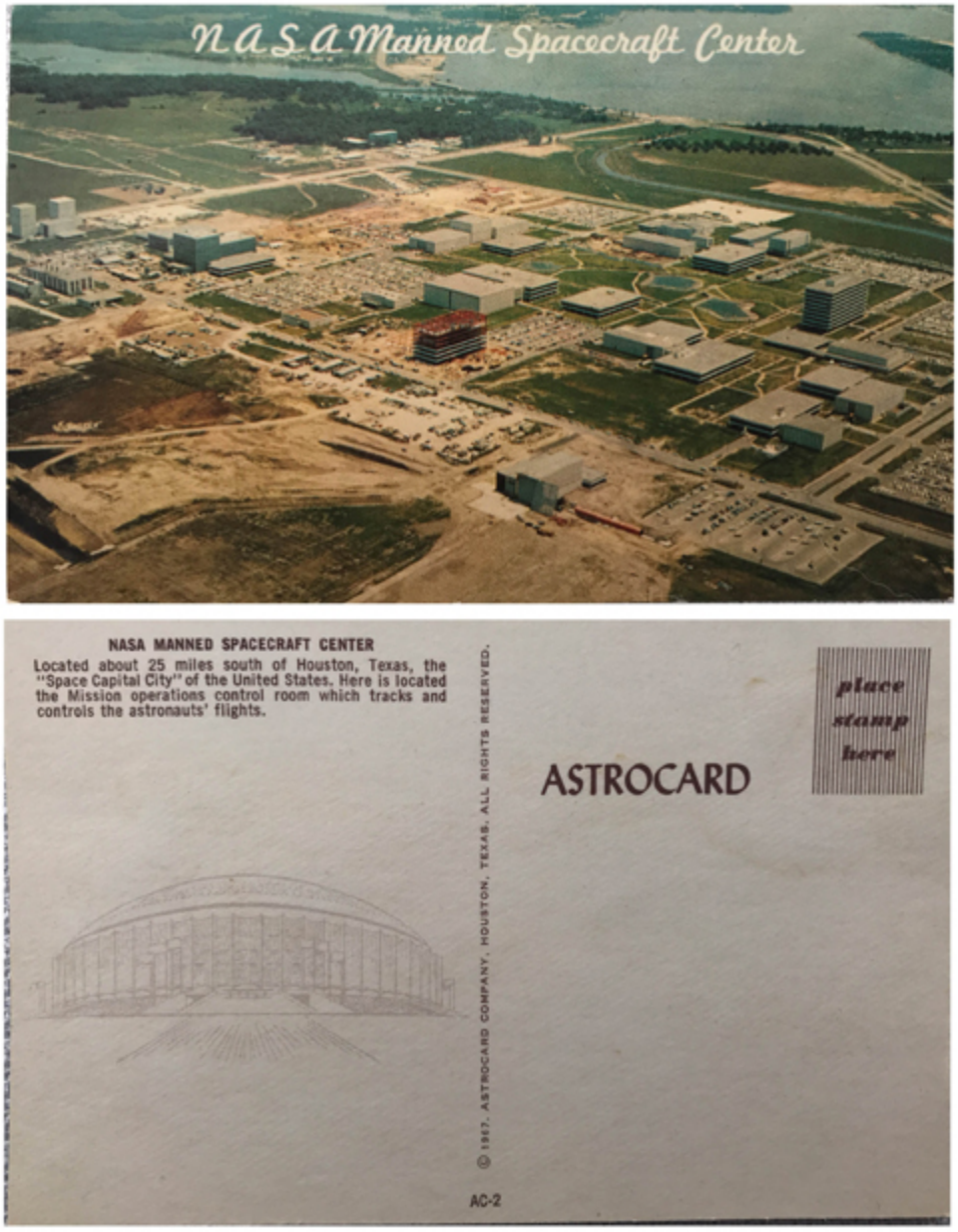


Figure 2.4 Astrocard postcard, front and back, n.d. In the collection of the author.



Figure 2.5 “Discover Houston” brochure, n.d. In the collection of the author.



Figure 3.1 Left: Launch of Apollo 9, March 3, 1969. NASA ID S69-25862
Right: Launch of Apollo 7/Saturn IB October 11, 1968. NASA ID S68-48662
Bottom: Launch of Mercury Atlas 9 May 15, 1963. NASA ID S63-07602



In March, April and May of 1966, the Spaceport News ran a series of articles describing archeological finds in the area. For the benefit of those, like myself, who are relative newcomers, the following is a condensation of those articles.

The first missiles — with chipped flint nosecones — were launched from the land now owned by KSC some 3,000 years ago by primitive Indians.

Several sites of Pre-Ceramic Period Indian life dating back to as far as 2,000 to 3,000 B.C. have been found on the northern half of Spaceport property, between Titusville and Oak Hill in the Mosquito Lagoon area.

The sites are composed of mounds called "middens." These vertiable islands of clamshells were mealtime refuse piles from that era.

Archeologists can pinpoint these particular middens to the period prior to 1,000 B.C. because there was no pottery made then and none was found in the middens.

SEMI-NOMADIC

These Indians traveled in semi-nomadic bands of 50 or less and used temporary windbreak shelters for protection from the elements. They made tools of shell and spearheads of flint, and ate fish and game primarily.

The uncomplicated and primitive society is exemplified by the fact that they didn't bury the dead in mounds. Instead, they left the bones in the shell refuses.

The Orange Period began in Florida bout 1,000 B.C., recognized as the time Indians began making a crude type of pottery by mixing clay with Spanish moss.

SITES SCARCE

Spaceport sites dating back to this era are not numerous. There is one in the Launch Complex 39, Pad A area and others along the shores of the Banana River by the Air Force Titan III facilities.



ARCHEOLOGIST George Long, LTV employee, examinies a shell fragment used as a tool by Indians who used to inhabit the Spaceport area. The shell was dug from a "midden" or mound, which was a refuse pile of the Indians.

The next era was the St. John's Period, locally known as the Malabar Period. Pottery making methods were greatly advanced in this period and community burial mounds were started.

At the Ross Hammock Site near Oak Hill, dirt is piled 25 feet high in an area 150 feet in diameter. The mound is full of skeletons at varying levels of depth. Evidence of at least 40 separate burials was found in a small portion of the mound.

ST. JOHNS PERIOD

The second St. Johns period began around 800 to 1,000 A.D., distinguished by still better pottery techniques. Indians used a carved wooden paddle and slapped the wet surface of clay pottery to achieve a "check stamp" design.

Population continued to expand in the Merritt Island area. From the Spaceport south was one of the few areas in the world where people maintained a fairly civilized standard of living — large villages, political organizations, complex ceremonials — without becoming involved in agriculture.

The first recorded arrival of white men in the area was in 1513, when Ponce de Leon cruised by the mouth of the St. Johns and then came back to the Cape and anchored off shore. However, it is believed other unidentified Europeans had sailed by the area because the Cape is clearly shown on earlier maps.

AIS INDIANS

The natives of the Spaceport area were known as the Ais Indians. The Indian River was callee 'Rio de Ais" until the American settlement.

Throughout this period the local Ais Indians seemed to be particularly hostile to the Spanish.

A treaty of peace was made whereby the Spanish would give Ais chiefs money, yet the hostility continued. In one instance, the Indians killed the captain and six members of a ship's crew, captured the rest and held them for a ransom of cloth, linen and hatchets.

HOSTILITIES DIMINISH

At the turn of the 17th Century, the hostilities between Ais Indians and the Spanish had diminished considerably through the efforts of a Spaniard named Alvaro Mexia, dispatched to the area to make peace offerings.

Physical evidence of the Spanish here has been found in the form of olive jar fragments and pieces of mirrors near LC-39's Pad A, and along the Banana River opposite the Titan III facilities.

A little later, the Ais were virtually exterminated by raiding tribes from Georgia and the Carolinas, and by 1763 the few remaining local Indians had left the area. Some were captured and made slaves, while others made their way to protective custody under the Spanish in St. Augustine.

SPANISH EVACUATE

When the Spanish evacuated Florida shortly afterwards, they took these Indians to Cuba and other points in the New World, leaving much of Florida completely unoccupied.

Other historical remains found in the area include those from shipwrecks.

Three vessels were sunk off the Cape in 1570, two of them carrying hides.

Another shipwreck site was found in 1963 by Charles Harnett about four miles off shore. It was determined that the ship had gone down prior to 1750.

STEAMER ASHORE

A French steamer was blown ashore in 1790 with its cargo of shoes and boots. Although hundreds of shoes were gathered by settlers, they were so badly mixed that only one pair was found.

Odd shoes were thus in fashion locally for years.

Another wreck off of the Cape yielded long Oregon pine spars, an occasional barrel of West Indian rum and a few cases of French brandy.

Spanish coins dated 1813 were found on the beach north of Playalinda Beach, indicating there is a 19th Century wreck off shore.

About 17 years ago some odd-shaped Spanish silver pieces — quite possibly pieces of eight— were also found on the beach north of Playalinda.

Figure 3.2 "Counting Down with the Editor," Spaceport News (September 26, 1968): 8.

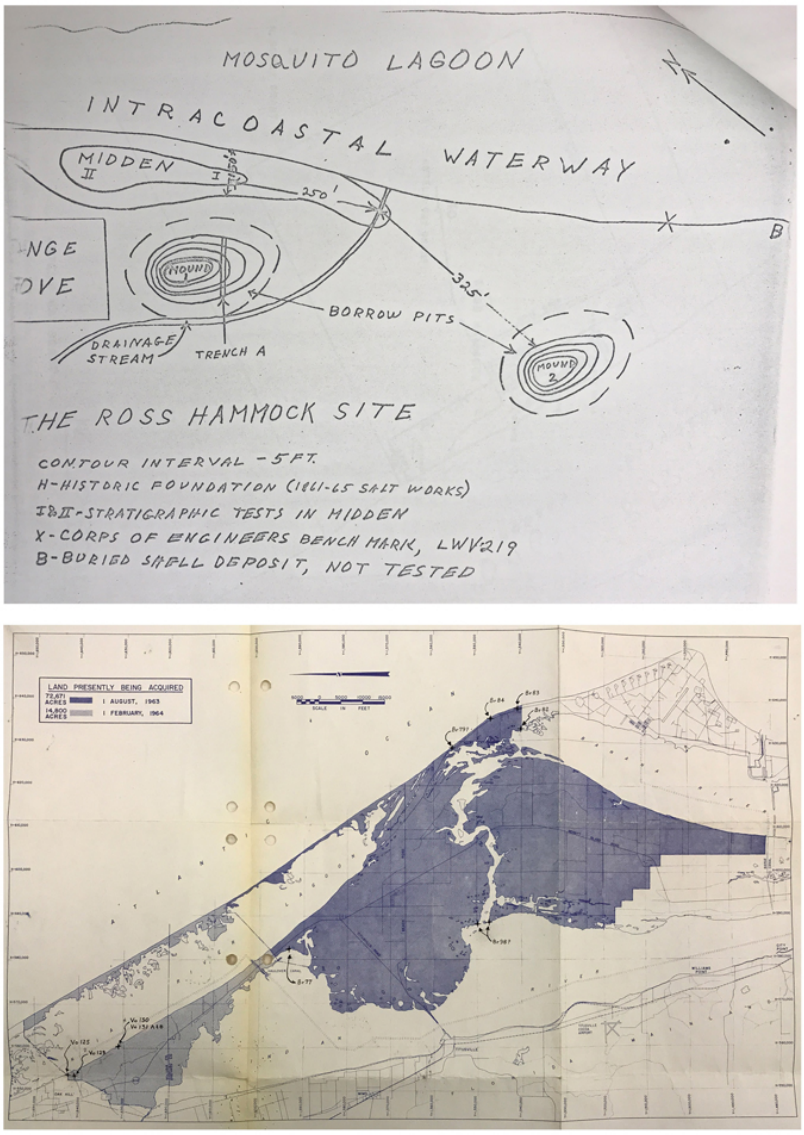


Figure 3.3 Top: Hand drawn map of Ross Hammock Site included with Florida Anthropological Society Correspondence; Bottom: Real estate map of KSC land acquisition with handwritten labels for individual archeological sites; Archaeological Sites, Ross Hammock; Ad Hoc Temporary Facilities- False Cape Data Collection Annex, Archaeological sites; Directorate of Design Engineering, Real Estate Branch 1963-1970, Directorate of Design Engineering, Requirements and Resources Office, Real Estate Branch, 12/1963 – ca. 1970; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).

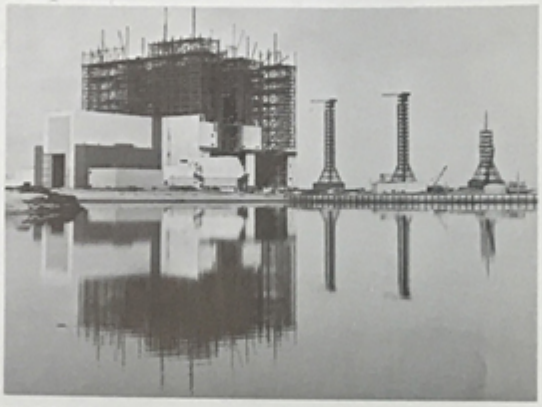
KSC Story -- From Marshland to Spaceport

What is now KSC was virtually a semi-wilderness when Pioneer I, the first U.S. deep space probe, was launched from Cape Kennedy October 11, 1958.

Just 11 days prior to that eventful date, NASA had been formed. Dr. Kurt H. Debus, now KSC Director, was then the Director of the Missile Firing Laboratory of the Army Ballistic Missile Agency at Redstone Arsenal, Ala.

At Cape Kennedy (then Cape Canaveral), an area of some 17,000 acres had been set aside for rocket development by the three military services. The area, which was to become known as Station No. 1 of the Eastern Test Range, was managed by the Air Force.

In 1958, KSC's present 88,000 acres at the north end of Merritt Island consisted mainly of palmetto scrub, citrus trees and marshland. Wildlife abounded in the area.



THE VAB, now a beehive of activity preparing Apollo/Saturn V space vehicles for future missions, was in this stage of construction on January 5, 1965. The reflection is across the Turn Basin.

TEAM TRANSFERS

When President Eisenhower transferred the Army's Saturn development team to NASA in the Fall of 1959, the launch facilities, laboratories and buildings under Army control at the Cape were part of the package. Included were Launch Complexes 5, 6, and 26, plus certain offices and hangars.

At the time of the transfer, the Army was in the process of constructing LC-34 as the launch site for the first generation of Saturn launch vehicles. Control of LC-34 was assumed by NASA.

LC-36 and LC-37 were subsequenty built and used by NASA. Launch Complexes 14, 17, and 18 were also made available to NASA.

In its first full year of operation at the Cape, NASA sponsored 12 launches of Beacon, Vanguard, Explorer and Pioneer satellites, plus the initial unmanned launch in the Mercury program, Big Joe.

LUNAR GOAL

The impetus for the Kennedy Space Center as it exists today came in the Spring of 1961 when President Kennedy announced as a national goal a manned landing on the moon.

After intensive study of possible launch sites, Merritt Island was chosen as the location for the new center. Immediately, Dr. Debus and his staff started transforming preliminary plans for KSC into reality.

Five years and some eight hundred million dollars later, the former virgin lowlands adjacent to Cape Kennedy became the nation's first operational spaceport. Within the first decade of its existence, NASA conducted 172 major launches from ETR and KSC in a variety of programs, including the highly-successful Mercury and Gemini series.

TENTH YEAR

During its tenth year, concluded the first of this month, NASA conducted eleven major launches at ETR and KSC, including two giant Apollo/Saturn V's from LC-39. In NASA's first decade, rocket boosters increased in size from the 150,000 pound thrust Thor-Able which launched Pioneer 1 on October 11, 1958 to the 7,500,000 pound thrust Saturn V which launched Apollo 4 on November 9, 1967.

From the initial handful of facilities transferred to NASA, the space agency's holdings in the Cape area have grown dramatically. Today it takes a handbook almost the size of a metropolitan telephone book to list all the facilities and support services under the control of NASA at KSC and the Cape.

There are 36 buildings in the Cape industrial area and eight major launch facilities at the Eastern Test Range. In a separate industrial area at KSC, another 36 buildings house a variety of facilities, including KSC Headquarters, the Central Instrumentation Facility, the Manned Spacecraft Operations Building, the Flight Crew Support Building, the Center dispensary, several propellant test facilities, and a number of warehouses.

Most impressive structure is the 525-foot tall Vehicle Assembly Building at LC-39 where Apollo/Saturn V vehicles are assembled.

In addition to major changes in geography and facilities, significant organizational changes have occurred at KSC during the past decade. The complex management organization evident today evolved from a small do-it-yourself government laboratory team.

When NASA came into being in 1958, Dr. Debus supervised approximately 280 Federal employees. Currently the KSC work force consists of some 25,000 government and contractor personnel.

IKE'S DECISION

President Eisenhower's decision in 1959 to consolidate the space program resulted in the transfer of the Debus launch team, together with the main body of Dr. Wernher von Braun's rocket development organization from the Army to NASA.

Negotiations for the mass transfer of 5,000 civil servants and extensive facilities in Alabama and at the Cape were handled for the space agency by Albert F. Siepert, then NASA's Director of Administration and now Deputy Director for Center Management at KSC.

Dr. Debus' launch team became the Launch Operations Directorate of the Marshall Space Flight Center July 1, 1960. Another major change occurred in 1962 when the LOD was given independent status as a NASA field installation and renamed the Launch Operations Center. Following the assassination of President Kennedy in 1963, LOC was renamed the John F. Kennedy Space Center.

EXPANSION

KSC's mission and capabilities were expanded in 1965 following the decision by NASA administrator James Webb that there would be an integrated NASA launch organization.

In January 1965 the Florida Operations Group of the Manned Spacecraft Center at Houston, Texas, joined the other NASA activities at KSC. This Mercury-Gemini launch team of

(See HISTORY, Page 3)

SPACEPORT NEWS

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Russell F. Hopkins, Staff Photographer

Figure 3.4 "KSC Story—From Marshland to Spaceport," Spaceport News (October 10, 1968): 2-3.



August 28, 1969 SPACEPO

Headquarters Pond Has 'Gator -You Name It And Win A Prize

KSC's 'Gator-in-residence has become a popular lunchtime attraction for those eating in the Headquarters Building cafeteria.

The bashful saurian is one of two placed in the pond in front of the Headquarters Building by the U.S. Fish and Wildlife Service about a month ago as part of a program to restore its natural ecology.

One of them has apparently left the pond and has been given the name of Gone Gator. The second, just a hair under three feet in length, has become somewhat of a freeloader as KSC personnel feed him remnants of their lunches.

But for all the easy familiarity of Spaceport workers with 'gator, the alligator lacks a name.

To fill this gap, the Spaceport News is running a Name-the-Gator contest.

Suggested names must be received at the Spaceport News office, PA-PIB, no later than Friday, September 5, in order that the winning one may be announced in the next issue.

The winner will be selected by a committee whose membership wishes to remain anonymous.

The prize will be a set of 10 color lithographs on Project Apollo and a copy of the colorful booklet "In This Decade." A less tangible prize will be the undying gratitude of the now nameless 'gator.

Another step towards restoring the pond's life balance took place last Thursday when the Fish and Wildlife Service stocked it with bass and bream.

Hal O'Conners of the Fish and Wildlife Service gave Spaceport personnel a few tips leading to a peaceful coexistence with their unofficial pet.

"Treat 'gators like snakes — with respect," said O'Conners. "Don't bother them or get too close. Young alligators, especially, are very fast. You have nothing to fear as long as you don't get too close or try to pet them."

Record Is Set By KSC Branch

In the month of July, when the KSC-launched Apollo 11 mission landed the first men on the Moon, the KSC Educational Programs Branch set a record for distribution of educational material.

It distributed 717 teacher kits, 735 special Apollo student kits, and handled 300 individual requests for information, a total of 20,374 pieces of material, according to William Nixon, Chief of the Branch.

Figure 3.5 "Headquarters Pond Has 'Gator - You Name it and Win a Prize," Spaceport News (August 28, 1969): 3.

Native Plants, Imports Add Beauty



TROPICAL PLANTS and Gail Richards, NASA Heavy Equipment/Roads and Grounds Section employee, add beauty to the Visitors Information Center at KSC.

Sabal is no lady and Paurotis Wrightii not a visiting Italian diplomat. Phoenix Canariensis is not a bird nor is Melaleuca Leucadendron a Polynesian beauty queen.

They're all plants used in the KSC landscaping and those not native to Central Florida are imports that can stand up to the cold waves that hit the Spaceport during those winters the Chamber of Commerce would just as soon forget.

To the northern newcomer, they may appear to be just some more of the kookie Florida vegetation but they're plants that have been proven for the area and can be recommended for home landscaping projects.

For that's where many of them stood originally—around the private homes dotted around the property bought by NASA for KSC.

Conspicuous by their absence are the regal Royal and gracefully curved Coconut Palms. There's a reason for this—both are cold tender and would probably perish in one of the area's infrequent freezes.



BEAUTIFICATION is part of the job of Harrell Cunningham, Chief of the Heavy Equipment/Roads and Grounds Maintenance Section.

PLANTS AT SAVINGS

"Virtually all of the plants at the Visitors Information Center (VIC) came from former homesites here," said Harrell Cunningham, Chief, Heavy Equipment/Roads and Grounds Maintenance Section.

They were gently dug out of their former homes and moved to a holding area off the Kennedy Parkway and held for use in such projects as the VIC, saving much in landscaping expense.

The VIC perimeter drive is lined with tall, stately queen palms, known also as Cocos Plumosa and Arecastrum Romanzoffianum. By any name, it's a Central Florida standard and well adapted to conditions here.

Lining the sidewalk on the south side of the VIC is a tier of small trees with brilliant crimson "brushes" near the tips of their branches. This is an Australian import known as the weeping bottlebrush to the man on the street and Callistemon Viminalis to the serious student of plant life.

COLORFUL FLORA

Adding beauty to the VIC courtyard are colorful crotons, hibiscus, banana clumps, purple queen, clumps of Phoenix Reclinata palms, sagos, Areca palms and dwarf bamboo.

The Headquarters Building sidewalks are lined with tall and rugged Washingtonia Robusta palms, as tough and hardy as their name implies. Natives of California, they grow far up into Georgia and can take an occasional cold snap.

Also in the Headquarters Building vicinity are the native Sabal Palms, the formal and stately Canary Island Date Palm (Phoenix Canariensis), Cocos Plumosa, clumps of Phoenix Reclinata and Paurotis Wrightii, the latter in tall and willowy groupings.

Color is provided by orchid trees and the beautiful but deadly oleander. "Look but don't touch" is the rule to follow with oleander; chewing a leaf or even inhaling the smoke from burning cuttings can be fatal.

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sociologists, psychologists and political scientists—in meeting the needs of society."

Dr. Winston Kock, Chief Scientist for the Bendix Corporation, said reliability developed at any cost in space programs is now putting U.S. products out front commercially while the systems approach and research and development are keys to advancement.

Kock said satellites will cause long distance rates to come down and big rocket boosters will be able to orbit entire TV transmitting stations.

The Director of Technical Research and Development for the Genesco wearing apparel manufacturing firm, William Smith, said his company is using space-developed techniques to modernize after realizing "We either mechanize or we move to Hong Kong.

Dean Arthur Weimer of Indiana University said universities are studying NASA's vast storehouse of technical and management information and disseminating it to businesses across the country.

Dr. Richard Lesher, head of Technology Utilization, NASA Headquarters, emphasized that while "space" is primarily an investment to create the wealth of the future, the application of space techniques to earthbound problems is already being done.

Figure 3.6 "Native Plants, Imports Add Beauty," Spaceport News (March 27, 1969): 8



Figure 3.7 Cover of The Kennedy Space Center Story (National Aeronautics and Space Administration, n.d., ca. 1981). In the collection of the author.

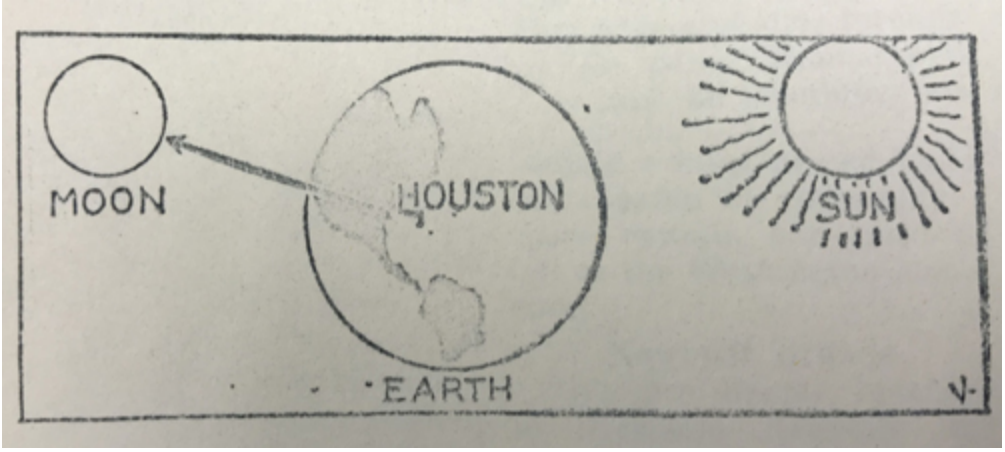


Figure 4.1 Diagram from Richard Boyce, “1000-Acre Rice U Trace in E. Harris Site of Giant Project,” *The Houston Press* September 19, 1961.



Figure 4.2 “Manned Spacecraft Center Has Moved to … Houston,” Booklet (National Aeronautics and Space Administration, n.d., ca. 1962); Lease of Temporary Facilities; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).



Figure 4.3 Top: “Manned Spacecraft Center Has Moved to … Houston,” Booklet (National Aeronautics and Space Administration, n.d., ca. 1962); Lease of Temporary Facilities; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston). Bottom: Press photograph, “View from Seabrook Loop Road - Artist’s Concept - MASA, MSC - Clear Lake.” (NASA ID 62-MSC-6, 1963).

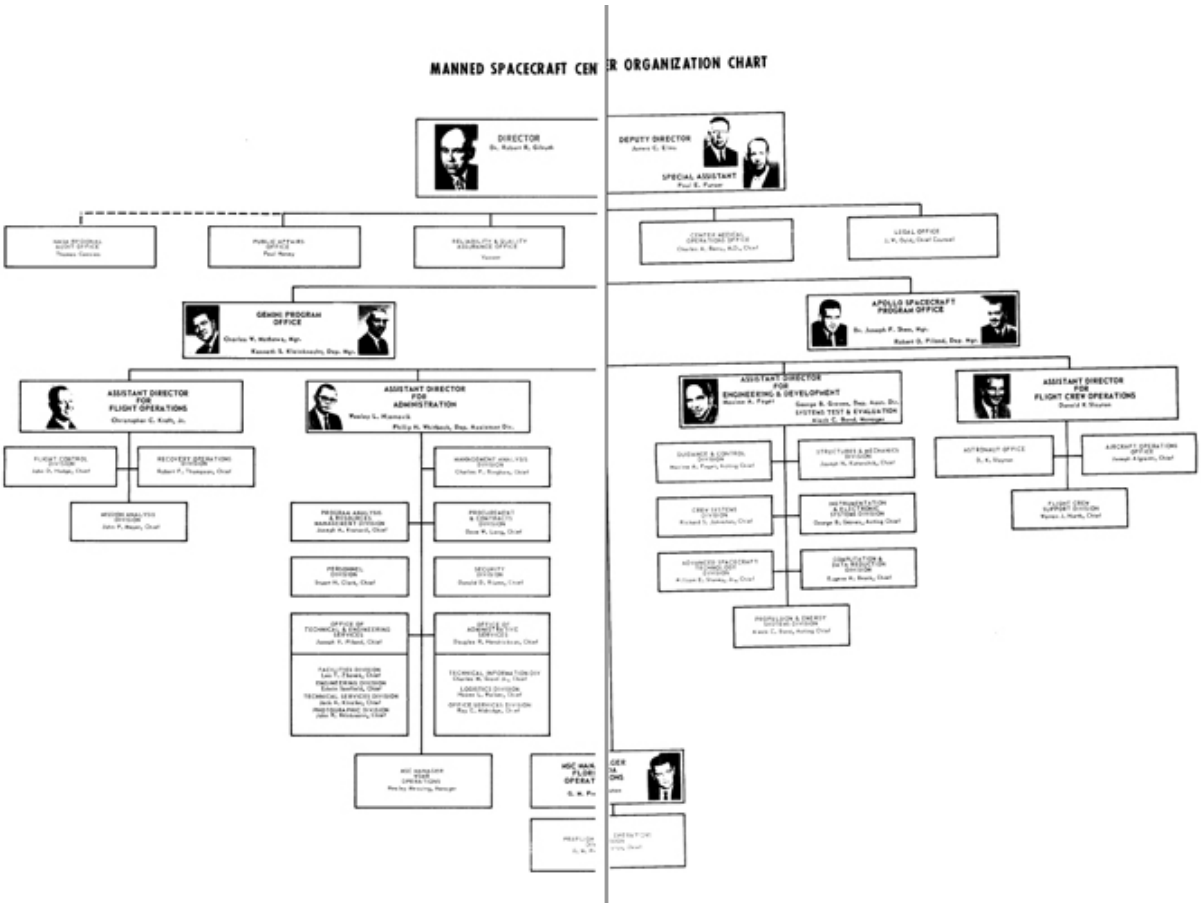


Figure 4.4 Organizational chart, from “MSC Structural Reorganization To Strengthen Space Programs,” *Space News Roundup*, November 13, 1963.



Figure 4.5 Relocation polaroids, NASA (1963). Top: “Flamingo Bay (water-front-high) no water damage, overlooking bay.” Bottom: “Toward Clear Lake from West Mansion near permanent site.”; Polaroids w/ Handwritten Annotation - Relocation, Inspection Tour, Homes, Interim Facilities, Schools; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).



Figure 4.6 Relocation polaroids, NASA (1963). “Baywood area, swimming beach, on water - no Hurricane damage, Boat ramps, This house for sale at $27,500.” Polaroids w/ Handwritten Annotation - Relocation, Inspection Tour, Homes, Interim Facilities, Schools; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).



Figure 4.7 Relocation polaroids, NASA (1963). “Damage on low Galveston bay (hurricane).”; Polaroids w/ Handwritten Annotation - Relocation, Inspection Tour, Homes, Interim Facilities, Schools; MSC Construction of Facilities (Box 11); Organization Files; JSC History Collection; University of Houston Clear Lake Archives (Houston).



Figure 4.8 “Manned Spacecraft Center Open for Public VIewing,” *Space News Roundup* n.d. (1964). In the collection of the author.

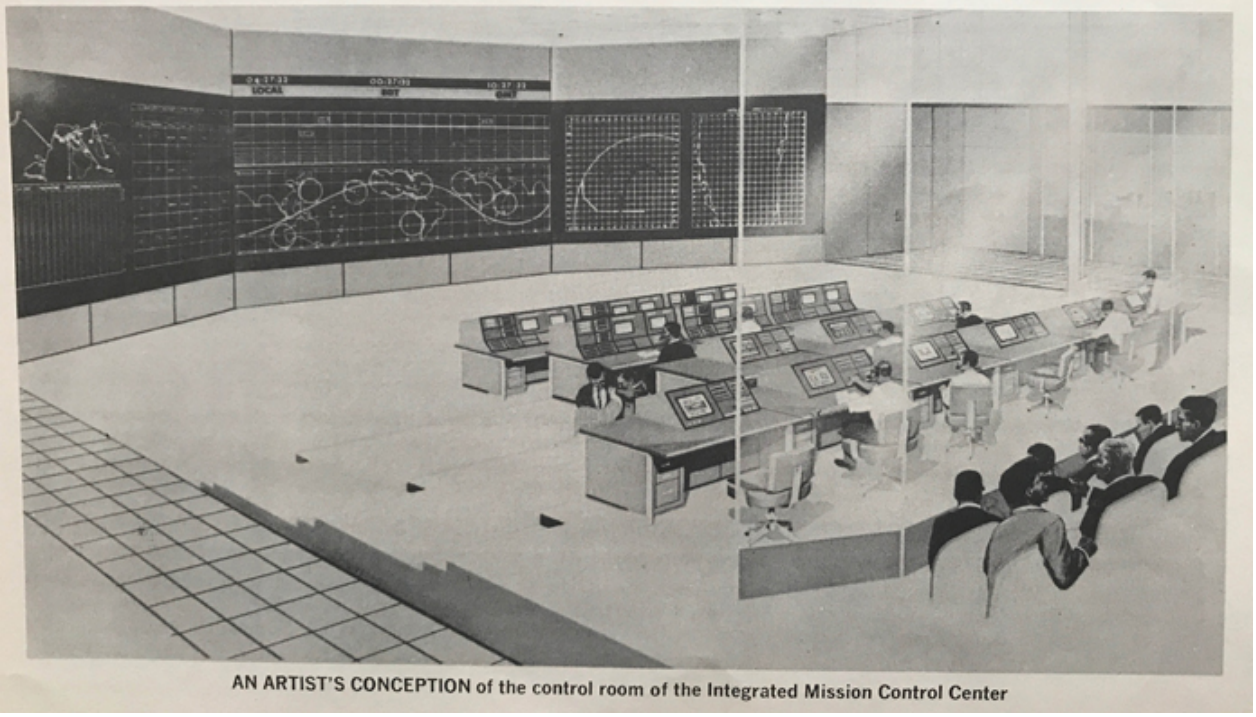


Figure 4.9 “Manned Spacecraft Center Open for Public VIewing,” *Space News Roundup* n.d. (1964). In the collection of the author.



Figure 4.10 Brochures for the Manned Spacecraft Center and Johnson Space Center. (NASA, n.d.). In the collection of the author.



Figure 5.1 Cartoon, *Spaceport News* January 3 1963: 5.



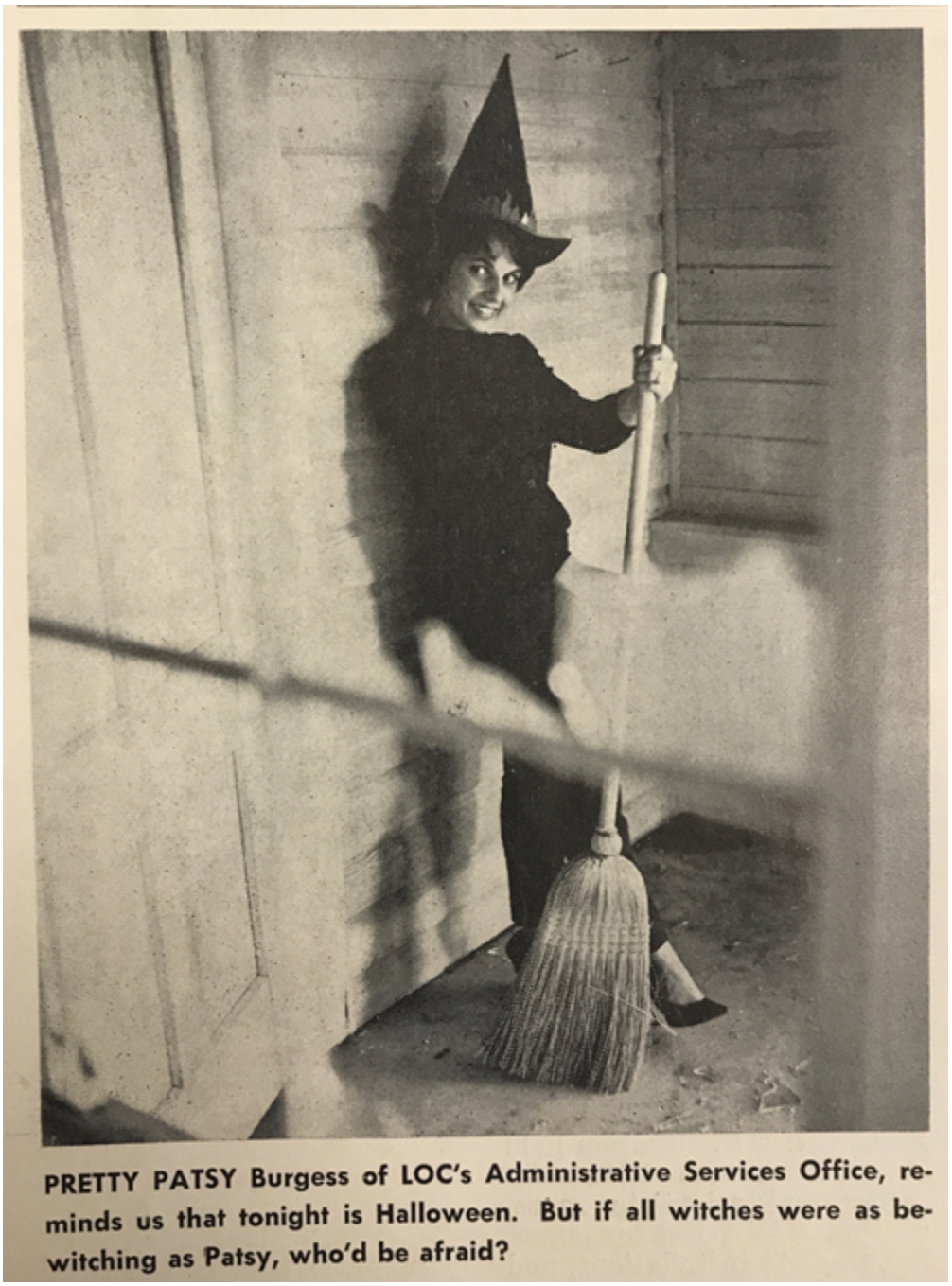
Figure 5.2 Cartoon, *Spaceport News* January 24, 1963: 3.



HEAD FOR THE BEACH . . . SPRING IS HERE!

LOVELY RED HEAD Evelyn Schwartz of LOC's Technical Library staff ushers in the first day of Spring with an enthusiastic game of catch in the surf. The new season began officially today at 3:20 a.m. (EST). Actually, if the earth's axis were perpendicular to the plane of the planet's orbit around the sun all year long, like it is today, there would be no change of seasons, day and night would be of equal length, and there would be equitable conditions of temperature. But if that were true, we wouldn't have had any reason to run the pictures of Evelyn.

Figure 5.3 "Head for the Beach...Spring is Here!," Spaceport News, March 21, 1963: 3.



PRETTY PATSY Burgess of LOC's Administrative Services Office, reminds us that tonight is Halloween. But if all witches were as bewitching as Patsy, who'd be afraid?

Figure 5.4 *Spaceport News* October 31, 1963: 1.



Page 2 SPACEPORT NEWS June 20, 1963

SPOTLIGHT

WOMEN'S ROLE IN SPACE

They talk about a woman's sphere as though it had a limit;
There's not a place in earth or heaven,
There's not a task to mankind given,
There's not a blessing or a woe,
There's not a whispered "yes" or "no,"
There's not a life, or death, or birth,
That has a feather's weight of worth
Without a woman in it.

(Kate Field)

The above lines, written nearly a century ago, could easily be adapted to NASA career girls by simply inserting the word space in an appropriate spot.

Certainly, as shown on pages four and five, there are many space-related careers open to women, with the sole job requirement being merit rather than sex.

Yet not all disfaff duties can be as glamorous as those depicted or as those of Russia's Cosmonette, Valentina Tereshkova. But, in such a highly technological and specialized field as space, a secretary, a file clerk, a typist, although performing relatively mundane chores, is by the nature of carrying out these duties relieving her boss so he (or she) may concentrate on more important matters.

So regardless of the job filled, be it a steno-pool typist or a research scientist, each woman is performing functions needed to keep the overall organization moving smoothly.

MORE MILES PER GALLON

Satisfied with your gas mileage?

Veteran Mobil Economy Run expert John Rich, a man who gets more miles per gallon than anyone else, recently offered some tips on how to save petrol.

"A major aim," he says, "is to try and avoid all stops. If we spot a red signal during a run, we try to hold the speed so the light will turn green when we reach the intersection.

"Keeping the car in motion and traveling at a steady speed as much as possible is of utmost importance," he emphasized. "It's the stop-and-go and speed variations that eat into gasoline mileage."

Rich doesn't recommend "jack-rabbit" starts, but he said he starts off "briskly," even on the economy runs.

"I usually hit the accelerator until I reach 30 mph in about 10 seconds and then ease off and take advantage of the momentum of the car.

"Most drivers," Rich continued, "make the mistake of getting a fast breakaway only to be halted within a block or two in city driving. Getting going again takes lots of gasoline and this is what drops gas mileage."

What Rich didn't advise, was how one could abide by these rules in the traffic-clogged Cape area.

SPACEPORT NEWS

Published each week by the National Aeronautics and Space Administration's Launch Operations Center, Cape Canaveral, Florida.

GRAND FENWICK'S Queen Julianna XIII (veteran British actress Margaret Rutherford), and Fenwick's Ambassador, (James Sterling Morad), prepare to receive guests at the Cape Colony Inn. The "royal visit" commemorated the premiere of the British movie, "Mouse on the Moon," a space satire.

Duchy of "Grand Fenwick" Takes Over Space Race Lead

America and Russia both lost in the race to the moon Friday night when a rustic rocket, powered with a potent wine fuel, landed two representatives of the Duchy of Grand Fenwick on the lunar surface.

Fenwick, a fictional middle-European country, and its surprising space program were subjects of the British movie satire "Mouse On The Moon," which premiered in the United States at the Cape Colony Inn Friday.

The resplendent premiere, promoted by James Sterling Moran, was well attended by top area missile and space representatives, including Astronaut Gordon Cooper and his family.

The movie was preceded by a poolside cocktail party, and following the show, United Artists, distributors of the film in the U.S., served samples of Grand Fenwick's exotic rocket fuel (wine).

The film poked good-natured fun at the space race. It was a sequel to the popular space spoof, "The Mouse That Roared," when Grand Fenwick declared war on the U.S. with the intent of losing.

In "The Mouse on the Moon," the Duchy of Grand Fenwick, needing money to put plumbing in the royal castle, requested a $500,000 loan from the U.S. for space research. Uncle Sam instead, gives Grand Fenwick $1 million outright, and Russia, not to be outdone, donates an outmoded Vostok rocket.

No one believes the rocket, housed in the castle's tower (gantry), will ever get off the ground. But a sage old professor discovers that Grand Fenwick's errant wine crop can be used as fuel to propel the rocket to the moon, and he and an aspiring astronaut, to everyone's amazement, suddenly take off.

U.S. and Russians then hurry back to their respective launching pals and fire rockets, timed to land two-man capsules on the moon at the same time the shower - moving Grand Fenwick spacecraft arrives.

But, through a miscalculation of speed, the Grand Fenwick crew gets there first. The tardy Americans and Russians, in haste to return to earth first, blast their rockets deep into the lunar terrain, and have to come home with the successful Fenwick team.

June 20, 1963 SPACEPORT NEWS Page 3

ATTRACTIVE ANGLER Bettye Latham of Protocol gets an early jump on summer, which officially begins tomorrow, by participating in a favorite pastime. After a rather frustrating first cast, left, above, she studied the book to perfect her technique. She had quite a battle, above right, only to boat a boot. But perseverance paid off, below, with a nice bass. Bait? What fish needs it with Bettye angling.

News Photos by Ron Hopkins

French Learn About Space At Goddard Via International Cooperative Program

Twelve French scientists complete their training at Goddard Space Flight Center here this spring and go home to help build France's first satellite for launching by NASA.

The French project is one of eight NASA cooperative international flight programs in the peaceful exploration of outer space. Under these programs, engineers and scientists from Argentina, Brazil, Canada, India, Italy, Japan, Pakistan and the United Kingdom have worked and trained at Goddard, the Langley Research Center at Hampton, Va., and Wallops Station, Va.

Joint Program

The French are engaged with NASA in a joint, two-part program. In the first part a French payload will be launched later this year by a NASA sounding rocket from Wallops Island, to study very low frequency (VLF) field strength and electron density in the region of 42 to 62 miles altitude.

The second and final step, possibly in 1964, if the early probe is successful, will be the launching by a NASA Scout vehicle of a French satellite with experiments to study VLF characteristics above 62 miles.

In their work at Goddard and other NASA centers, foreign scientists and technicians gain experience they will utilize in such laboratories as the National Center for Space Studies (CNES) in France.

Their training is put to constructive use in their own country.

Pakistani scientists and engineers, for instance, returned home to build a launch site with NASA cooperation and to embark upon atmospheric and meterological probes.

The Brazilians have established satellite tracking programs, and the United Kingdom, for whom NASA launched the still-orbiting and transmitting ionosphere study satellite ARIEL last year, has its follow-on space program well underway.

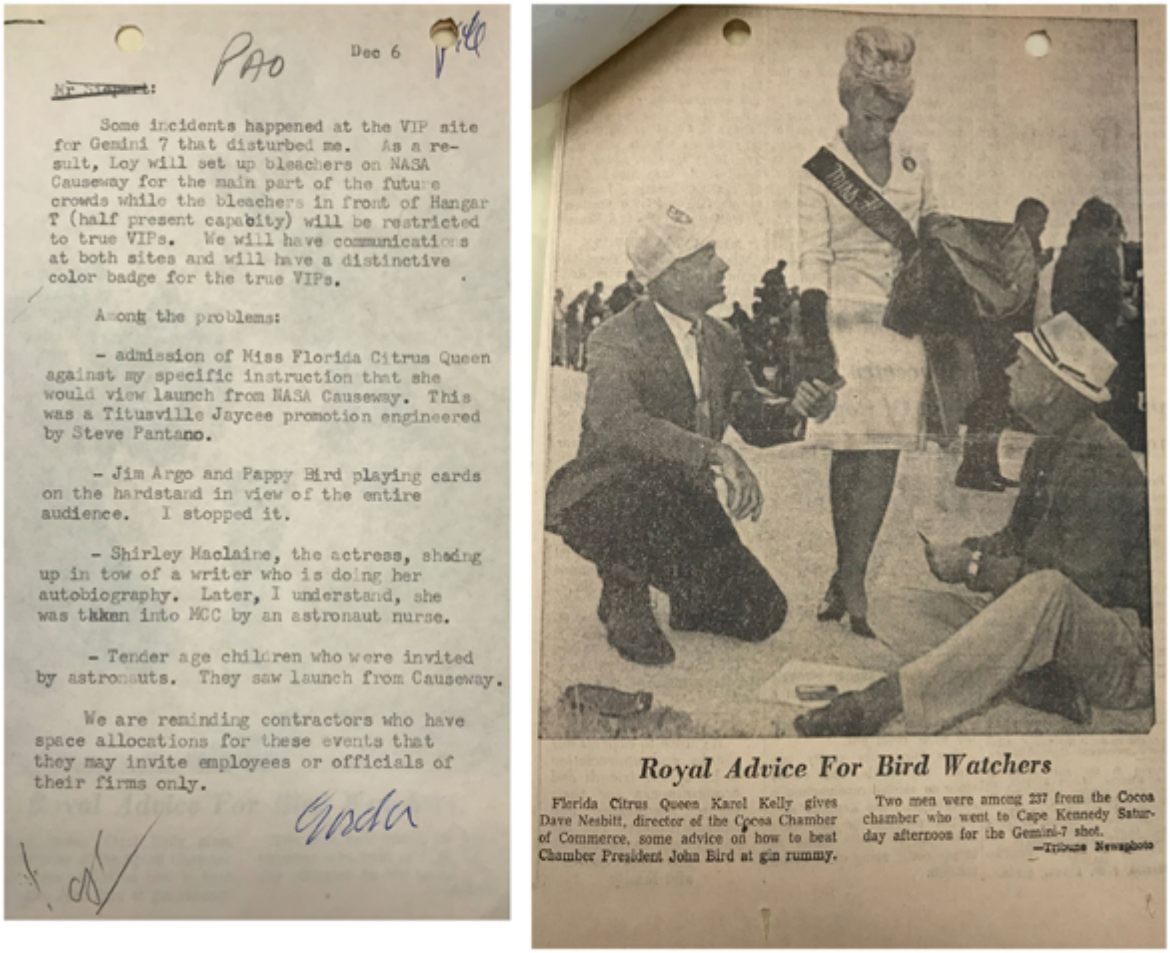
CONSTANTINE "Gus" Proferes, pioneer spacecraft inspector of NASA's Manned Spacecraft Center at the Cape, has left Civil Service to join a lumber partnership in Virginia. He received a set of 7 x50 binoculars as a farewell gift from MSC Inspection Department associates.

Tech Writers To Meet

Organizational meeting of the Society of Technical Writers and Publishers, Cape Canaveral chapter, will be held Wednesday night at 7:30 p.m. at Schrafft's Carriage House.

Russell Hill, Organizational Committee Chairman, said the chapter will elect its first set of officers at the meeting. Anyone interested in the organization is invited to attend.

Figure 5.5 *Spaceport News*, June 20, 1963.



PAO Dec 6

Mr [redacted]:

Some incidents happened at the VIP site for Gemini 7 that disturbed me. As a result, Loy will set up bleachers on NASA Causeway for the main part of the future crowds while the bleachers in front of Hangar T (half present capability) will be restricted to true VIPs. We will have communications at both sites and will have a distinctive color badge for the true VIPs.

Among the problems:

- admission of Miss Florida Citrus Queen against my specific instruction that she would view launch from NASA Causeway. This was a Titusville Jaycee promotion engineered by Steve Pantano.

- Jim Argo and Pappy Bird playing cards on the hardstand in view of the entire audience. I stopped it.

- Shirley Maclaine, the actress, shading up in tow of a writer who is doing her autobiography. Later, I understand, she was taken into MCC by an astronaut nurse.

- Tender age children who were invited by astronauts. They saw launch from Causeway.

We are reminding contractors who have space allocations for these events that they may invite employees or officials of their firms only.

Gordo

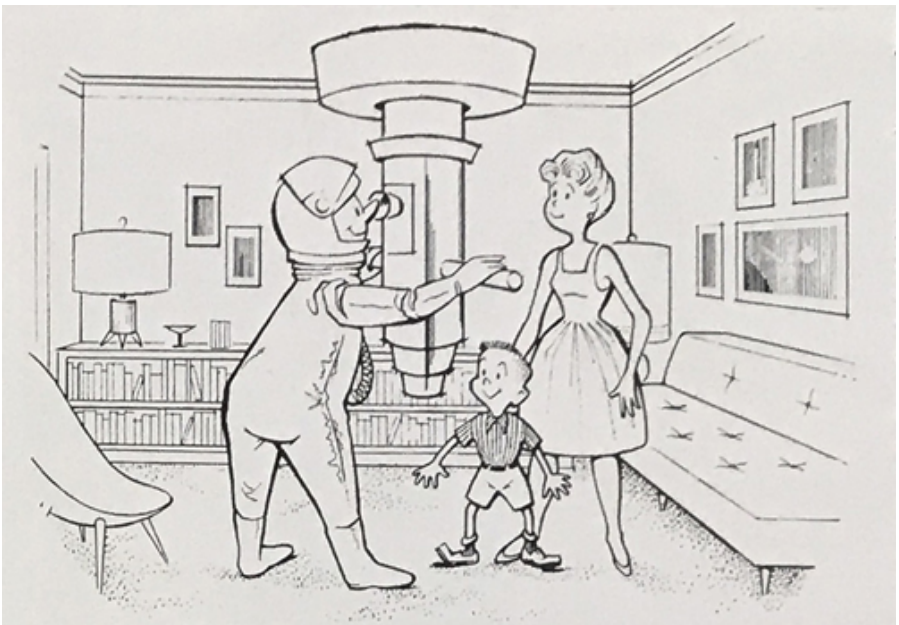
Royal Advice For Bird Watchers

Florida Citrus Queen Karel Kelly gives Dave Nesbitt, director of the Cocoa Chamber of Commerce, some advice on how to beat Chamber President John Bird at gin rummy.

Two men were among 237 from the Cocoa chamber who went to Cape Kennedy Saturday afternoon for the Gemini-7 shot.

—Tribune Newsphoto

Figure 5.6 Left: Gordon Harris to Albert Siepert, December 6, 1966; Right: Newspaper clipping, “Royal Advice for Bird Watchers.” (1965); Gemini 11; News Media FIles Gemini 6 - Gemini 11; Office of Manned Space Flight, Public Affairs Office ?-?; Kennedy Space Center Files; Records of the National Aeronautics and Space Administration; National Archives and Records Administration-Southeast Region (Atlanta).



Wall-To-Wall Brick

"HERE COME THE SCHIRRAS, DEAR"

A Houston homebuilder, Frank Marsters, had his problems recently, constructing houses for four Project Mercury astronauts.

The spacemen, in searching residential areas surrounding the Manned Spacecraft Center, wanted privacy above all.

Marsters and the astronauts settled on homes with windowless fronts, adding enclosed gardens to make up for the missing out-of-doors views.

John Glenn, Scott Carpenter, Wally Schirra and Gus Grissom all moved within two blocks of each other, to a subdivision called Timber Cove.

Gordon Cooper, now training for his MA-9 mission in the Spring, chose a house across Taylor Lake, five miles west of Timber Cove.

Deke Slayton decided to build on a heavily-wooded bayou about five miles west of Galveston Bay.

Alan Shepard moved into an apartment in the Rice University district.

The nine new astronauts also are in the process of obtaining dwelling places in the Houston area.

The windowless fronts probably will serve their purpose and assure privacy for the astronauts.

But they have one major drawback.

Unless they devise an arrangement similar to artist Loren Fisher's concept, above, they will have no way to detect peddlers.

Figure 6.1 Cartoon, "Here Come the Schirra's, Dear," *Spaceport News* January 3, 1963. 7. Cartoon by Loren Fisher.



Figure 6.2 Swimming pool in Timber Cove, Texas. Screenshot from Google Maps.