

“A MAN’S WORLD”?  
A STUDY OF FEMALE WORKERS  
AT NASA’S KENNEDY SPACE CENTER

by

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## ABSTRACT

By focusing on women workers at NASA's Kennedy Space Center in Florida, this study seeks to understand why women were initially congregated in certain occupations such as clerical work and later moved into non-traditional jobs such as engineering and the sciences. Such an investigation requires careful examination of the changing attitudes towards female workers in technical or non-traditional fields and why and how those attitudes changed over time and the extent to which this occurred. It also attempts to identify areas of continuing concern.

The study reveals that several factors contributed to the women's progress in the workplace. These included the rise of the second wave of feminism, the federal government's support for the new feminism, favorable U.S. Supreme Court decisions and the willingness of officials at NASA's Kennedy Space Center to implement federal decrees. In addition, the women's movement expanded its efforts to encourage women to gain the skills and education that were necessary to move women into scientific and technical fields, although recently that effort has reached a plateau.

The research for this study includes employee data from NASA and KSC, oral histories with female KSC workers, articles from KSC's official employee newsletter, *Spaceport News*, websites, and other secondary sources about women in technical fields, women in the workplace, and the recruitment of women into the labor force. Data from NASA and *Spaceport News* articles was also compared with information obtained through oral histories, to determine if the official policies of KSC influenced the behavior of its employees. Attention is also given to the legislation and court cases that opened doors for women seeking new avenues of advancement and the extent to which these outside factors influenced changes in women's employment and opportunities at KSC.

This study shows that the status of women at KSC changed along with the larger women's movement in America. Supreme Court cases and Equal Employment Opportunity laws helped women gain headway in fields traditionally occupied by men. Women received token representation at first, but later moved up in their fields and even became senior managers. This change took place over a long period of time and is still ongoing. At the same time, there is still strong evidence of backlash and some weakening on the part of federal government in terms of its willingness to support women's drive for equality.

To the three most important women in my life:

My mother, my aunt, and my grandmother.

You inspire me everyday with your strength, love, and friendship.

Thank you.

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## CHAPTER 1: INTRODUCTION

### *History*

The space age began in 1957 when the Soviet Union launched *Sputnik*, the world's first artificial satellite, into earth orbit. A year later, President Dwight Eisenhower created the National Aeronautics and Space Administration (NASA) out of the National Advisory Committee for Aeronautics (NACA), and thus began Project Mercury, the goal of which was to launch a man into earth orbit. During Projects Mercury and Gemini (which had two-man crews and practiced techniques needed to go to the moon) NASA launched all manned space flights from the Cape Canaveral Air Force Station (CCAFS) Florida's east coast, about halfway between Miami and Jacksonville. On May 25, 1961, mere weeks after Alan Shepard's became the first American in space, President John F. Kennedy issued a mandate to NASA to begin the Apollo program, which would "land a man on the moon and return him safely to the earth."

During the development of Project Apollo NASA realized that launching a large booster, such as the Saturn V, capable of flying to the moon would require more blast protection than provided by CCAFS. NASA needed its own launch site. Qualifications for the new Launch Operations Center (LOC) were good weather year-round, proximity to the equator, and the ability to purchase the large amounts of land needed to keep the site isolated. After much consideration, Merritt Island, Florida, just across the Banana River from CCAFS, was chosen as the LOC (it was later renamed the John F. Kennedy Space Center (KSC) after President Kennedy's assassination). Between 1962 and 1964 NASA acquired the land immediately north and west of CCAFS. KSC opened in 1962 and many of its employees migrated from the existing facilities at CCAFS, while others were new hires or workers from other NASA facilities. KSC

expanded as more facilities, such as Launch Complex 39 and the massive Vehicle Assembly Building (VAB), as well as the Industrial Area, were built to support Project Apollo.<sup>1</sup>

When Kennedy Space Center first opened, women worked mainly in clerical occupations, which was typical women's employment at the time. Today women work in every capacity and at every level of employment at NASA and in the workforce at large. The typical married woman and mother works for pay in the labor force in addition to working at home as a homemaker.<sup>2</sup> It was not always commonplace, however, to see women in all occupations, especially at KSC.

There are four job classifications within NASA – professional administrative, clerical and non-professional, technical support, and scientific and engineering. When KSC opened, there were few women in what are described as technical occupations, which include the scientific and engineering and technical support fields. Female technical workers were once considered such a rarity that they were featured prominently in employee profiles in *Spaceport News*, the official employee newsletter. This was partially to show that KSC had done its part in hiring women. Few females were employed as technical workers in the early years of KSC, and their numbers increased slowly over time. They were scarce in technical occupations for a variety of reasons, including a lack of qualifications, discrimination, and the then-existing social standards that segregated women into certain areas of work that included teaching, nursing, and clerical work. This thesis will examine why there were so few women working in technical fields at KSC when the Center first opened and how and why this number has risen over the past four decades.

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<sup>1</sup> Charles D. Benson and William Barnaby Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (Washington, D.C.: National Aeronautics and Space Administration, 1978).

<sup>2</sup> Barbara Reskin and Irene Padavic, *Women and Men at Work* (Thousand Oaks, CA: Pine Forge Press, 1994), 145.

There are two forms of sex discrimination that exist in the workplace. Overt discrimination consists of the refusal of employers to train, hire and promote women because they are not viewed as permanent or viable workers. Indirect discrimination consists of the consequences of social norms, such as educational discrimination, that discouraged women from reaching for certain kinds of work.<sup>3</sup> A few years after KSC opened, the federal government began pushing for civil rights in the workplace. New laws enacted in the mid-1960s forbade federal employers from discriminating on the basis of sex, race, religion, color, and national origin. As such, there were few instances when KSC overtly discriminated against female employees. Due to social standards of the time, however, which routed women into certain kinds of work, female technical workers were rare at KSC. They were consequently seen as anomalies and treated differently than male co-workers.

This thesis is divided into chronological periods as follows: Before 1962, 1962-1972, 1973-1979, 1980-1989, and 1990-present. Chapter 2: Before 1962 will discuss the evolution of women's public roles and why women became segregated into certain jobs. From its inception, women were active in clerical capacities at low government service (GS) levels and occupied most, if not all, of the secretarial positions at KSC. Although women always worked at KSC in some capacity, female technical workers during the Mercury (1958-63) and Gemini (1962-66) programs were scarce, and they faced many challenges such as prejudice from co-workers in the mostly male environment, incorrect assumptions about their field of employment, and segregation into lower GS-levels.

As time went on, women entered technical occupations and found that KSC provided numerous advancement opportunities and support for female employees. Chapter 3: 1962-1972

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<sup>3</sup> Alice Kessler-Harris, *In Pursuit of Equity: Women, Men and the Quest for Economic Citizenship in the 20<sup>th</sup> Century America*, (New York: Oxford University Press), 292.

will discuss women at Kennedy Space Center from its inception through the Apollo moon program until 1972, when women began to receive more support from the federal government. During Project Apollo (1961-75) women's opportunities grew but male technical workers still vastly outnumbered women. The increase in female employees seems to correlate with the 1964 Civil Rights Act, the Equal Employment Opportunity office at NASA in 1965, and other outside factors. References to women in *Spaceport News*, KSC's official employee newsletter, were different from today; for example, they were called ladies, girls, featured in pictures in their bikinis, and referred to as pretty and attractive.

Chapter 4: 1973-1979 covers the period after the push for affirmative action through the end of the 1970s and the beginning of Space Shuttle flights. Women's experiences changed dramatically entering the Shuttle era (1972-present) as NASA realized it needed to take advantage of the female labor force and publicly reach out to women in order to reach its goals for the Shuttle program as well as Equal Employment Opportunity. More women entered technical occupations during this time period and many women advanced from clerical positions to administrative jobs.

Chapter 5: 1980-89 discusses the period when working women became a social norm. Female employment in technical areas grew as more women saw opportunities in those areas, especially within the space program, and as societal attitudes regarding women's work began to change. NASA itself offered training and educational programs to help women move from traditional jobs to technical and supervisory positions. Equal Employment Opportunity laws and Affirmative Action plans required NASA to recruit the increasing number of females graduating with technical degrees. Similar laws currently call for NASA to report its employee demographics and explain why certain areas lack female employees. Also important was the

growing acceptance of women employees in typically “male” occupations by their co-workers and American society.

Chapter 6: 1990-Present describes the larger number of women working at KSC today, even though they are still a minority at KSC in technical capacities. Today there are many female managers and women in every occupational area. The majority of NASA women work in the professional administrative field at increasingly higher GS levels. Changing technology, such as the computer, and job responsibilities, such as increased clerical work for technical workers, allowed women in clerical positions to advance in their careers.

Despite advances for KSC women they still sometimes encounter glass ceilings at work. Women with non-engineering degrees at KSC especially find it hard to advance to higher levels of employment, because many high-level jobs require engineering degrees and a special rating. The number of female engineering graduates in recent years has hit a plateau, and many companies, including KSC, find it difficult to recruit both males and females. As a government organization, KSC requires a security clearance for employment, which is harder to achieve for naturalized Americans and non-citizens. One can clearly see the trend of increased female employment and a move into technical areas when analyzing the KSC workforce over the past forty years.

### *Strategy*

Space historiography is a relatively new field. Scholars have discussed the history of specific space missions, programs, astronauts, and how the space industry affected the growth of nearby communities. They have paid little attention, however, to the participation of women in a typically male-dominated field. This study will investigate the involvement of women as workers at KSC, with a specific focus on technical workers and NASA employees. To reiterate,

for the purposes of this thesis technical occupations are defined as those involved in the scientific and engineering and technical support fields. Since it is hard to find records for contractor employment, this thesis will focus on women employed by NASA, although contractor workers are discussed to better understand women's overall place in the workforce.

This study will show that better opportunities for women evolved from the Civil Rights Act of 1964, other legal rulings, and the special parameters of federal employment. Changes at KSC correlated with a social revolution. New career prospects for women developed as a result of changing ideas about women workers and greater educational opportunities for women, especially in the technical fields. NASA's continued outreach to girls and its support of cooperative education and other student programs also increased the number of female workers.

The main sources for this thesis include the *Spaceport News*, the NASA Historical Data Book, and the NASA People website, other websites and secondary sources about women's employment, and oral histories conducted with female NASA workers. It will also examine "official" attitudes towards women, as evidenced by articles and pictures in *Spaceport News*, to determine how KSC referred to females in the past and how these references have changed over time. Since 1962 the newsletter has offered human-interest stories, information about the Center and its growth, and news regarding the space program. It "is an official publication of the Kennedy Space Center and is published on alternate Fridays by the External Relations and Business Development Office<sup>4</sup> in the interest of KSC civil service and contractor employees," and provides interesting data about the culture KSC and is a valuable resource to measure change throughout the Center's history. NASA employment data from 1969 to the present will help determine the extent of NASA's recruitment of women and compliance with Equal Employment

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<sup>4</sup> This office name has changed over time. It was previously called the Public Information Office and the Public Affairs Office,

Opportunity (EEO) Laws. This data will be used to better determine if KSC's verbal affirmations of female workers, especially those in technical areas, correlate with an expanding number of actual workers. This information will be compared to the actual experiences of female employees, ascertained through oral histories with female employees of all levels and occupations, to determine their perceptions of how the organization treated women.

Other sources used for this thesis include legal documents such as Supreme Court cases relevant to female employment, EEO laws and Executive Orders. It will also look at books regarding females in the workplace, female scientists, and other secondary sources about women in the aerospace field. Government reports, such as *American Women* by Margaret Mead and Frances Bagley Kaplan, will help determine the general status of women upon KSC's opening.

There are several research questions to address. Which positions did women typically occupy, what outside events changed their standing at KSC, what was the official position of KSC towards female workers and how did this stance concur with civil rights laws? What hardships did female workers face, did the workers' experiences reflect KSC's official stance, and how and why did women's roles change? Was either form of sex discrimination, overt or indirect, prevalent at Kennedy Space Center?

Opportunities for women at KSC have become more abundant and have changed in conjunction with societal ideals. Outreach is still needed to increase the number of women in technical fields, educate young girls about such job opportunities, and show the public that technical, scientific and aerospace fields are "normal" for women. Hopefully, through this examination of the interplay of the women's movement, the federal government's response to that movement, NASA's response to governmental directives and Supreme Court decisions, and changes in the aspirations of American women themselves, this study will add valuable

information regarding the status of women today in American society, the workforce, and the space industry in particular.

## CHAPTER 2: ABNORMAL WOMEN AND UNUSUAL SCIENTISTS -- BEFORE 1962

To understand the status of women workers when KSC opened in 1962 one must examine how they became concentrated in certain occupations and why those job segregations persisted. Females have been hampered by sexism, a longstanding cultural prejudice that sees them as inferior members of the human race and views their sex-segregated duties and occupations as less valuable than those of men. This chapter will discuss four main ideas about women workers before 1962. First, society's ideas about what constitutes "work," as well as opinions about women working outside the home, have changed dramatically since the colonial period. "Women's work" in America evolved from the unpaid domestic labor of wives and mothers in the nineteenth century to supplementary employment and careers of their own in the twentieth century. Second, females were not accepted in the technical fields, and were so rare that they were considered either unusual scientists or abnormal scientists, or both. To reiterate, the term "technical fields" includes occupations in the scientific and engineering fields, which are professional and often require advanced degrees, and the technical support classifications. Third, women's work in technical fields was tolerated during times of crisis such as labor shortages during World Wars I and II. Over time, however, their work became an acceptable career option. Although the majority of wives and mothers were forced back into the home after World War II, their acceptance in technical fields set a precedent for female technical workers and many women decided they wanted to keep working outside the home.

In *Women and Equality*, William Chafe discusses why sexism has been so persistent in American society. Assumptions about sex and also race have been so pervasive that many people never consider sex or racial discrimination a significant issue. Traits associated with femininity make sex segregation of the workplace and other types of bias seem normal. These

ideas are difficult to change due to the persistence of the separate sphere ideology, which states that the characteristics of men and women make them better suited for different areas of life and types of work. For example, the American public continues to associate breadwinning with men and homemaking with women. Chafe sees the separate sphere ideology as “a means of maintaining and reinforcing an imbalance of power between the sexes.”<sup>1</sup>

Alice Kessler-Harris explains in *Women Have Always Worked* that they played a major part in running farms and households during colonial times, when most work, including the manufacturing of clothes and basic necessities, was done inside the home. As American economic life changed, so did the reality and perception of women’s unpaid domestic work. After the American Revolution, the ideal of “Republican Motherhood” was emphasized. Women were now responsible for rearing citizens for the advancement of the republic.<sup>2</sup>

Industrialization forced both a reorganization of housework and paid labor, and, along with Republican Motherhood, helped create the ideology of separate spheres for men and women. As many functions, such as clothing manufacturing and food processing, began moving out of the home, wives and mothers devoted more time to caring for children and maintaining their homes to meet middle-class standards of domesticity. At the same time, because the industrial revolution sent increasing numbers of men to work in places away from the home, maintaining the household became even more separated from work for pay. As Jeanne Boydston notes, over two hundred years “the image of the colonial goodwife, valued for her contribution to household prosperity, had been replaced by the image of the wife and mother as a ‘dependent’

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<sup>1</sup> William Chafe, *Women and Equality: Changing Patterns in American Culture* (New York: Oxford University Press, 1977), 171-72.

<sup>2</sup> Alice Kessler-Harris, *Women Have Always Worked: A Historical Overview* (New York: The McGraw-Hill Book Company, 1981).

and ‘non-producer.’”<sup>3</sup> The new economy offered women few vocations other than unpaid domestic work as wives and mothers. Some females worked in mills such as those in Lowell, Massachusetts. The majority of these workers was young, unmarried, and usually left the workforce once they wed. Unmarried women, especially immigrants, earned small wages as maids in households or as laundresses. Thus, both females in the workforce and their employers saw them as only temporary laborers and therefore not worth training or educating for more advanced or supervisory positions. Although the profile of the female wage earner has changed dramatically throughout the twentieth century, many employers still view women in the workforce as temporary and less reliable workers whose first responsibility is to their family.<sup>4</sup> Given these attitudes, jobs for women opened slowly and the number of potential women workers always exceeded the positions available.

With that background, the female workforce has always been characterized by unfair practices that stem from their subordinate place in society. Kessler-Harris believes that the positioning of women as family members instead of workers accounts for many of the unfair economic institutions and practices society recognizes as traditional. These include the sexual division of labor, disparate wages for male and female jobs, the feminization of poverty, protective labor legislation that limits the hours and conditions of work for women and children only, and women’s greater dependence on government welfare. Women have been conditioned to accept a secondary role in most professions or a domestic role within the home. Men have been conditioned to expect women to stay in their “place.”<sup>5</sup> In the early 1900s newly adopted

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<sup>3</sup> Jeanne Boydston, *Home and Work: Housework, Wages, and the Ideology of Labor in the Early Republic* (New York: Oxford University Press, 1990), xi, 2-3, 29, 31.

<sup>4</sup> Kessler-Harris, *Women Have Always Worked*, 4.

<sup>5</sup> Judy Lomax, *Women of the Air* (New York: Dodd, Mead and Company, Inc., 1986), 200-1.

protective legislation, which limited the hours and working conditions for women and children, tended to institutionalize and reward familiar gender patterns, such as the male-breadwinner and the stay-at-home wife. By the late 1960s, however, what had once seemed fair (for example, protective legislation) came to be perceived as overt discrimination.<sup>6</sup>

One unfair practice in women's employment is job segregation. Women who worked outside the home often found themselves in the least skilled and lowest paid occupations and professions. In the early twentieth century women in the garment and food processing industries were assigned only the newly opened unskilled jobs, given the fewest possibilities for advancement, and treated as the most expendable members of the workforce. When managers preferred to hire women they did so because they could pay women lower salaries than male employees. In the early 1900s, the condition of women workers most likely resulted from the widespread belief that "women, as women, did not deserve good jobs, decent pay, or fair union representation."<sup>7</sup> When women did enter male-dominated fields like the sciences they were discouraged by unequal pay and inadequate promotion opportunities and often went back to more "female-friendly" fields.<sup>8</sup>

Many occupations became closed to women after professionalization of certain occupations occurred. Fields such as medicine and law began requiring specific education, testing, and licensing before individuals could gain the necessary credentials to practice. Science became a professional field, requiring visible employment to be a member of a professional society. Professionalization not only raised the level of certain occupations, but it also gave

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<sup>6</sup> Barbara Reskin and Irene Padavic, *Women and Men at Work*. (Thousand Oaks, CA: Pine Forge Press, 1994), 3, 15, 5.

<sup>7</sup> William Chafe, *The Paradox of Change: American Women in the 20<sup>th</sup> Century* (New York: Oxford University Press, 1991), 98.

<sup>8</sup> Chafe, *The Paradox of Change*, 80, 81, 118.

certain fields a distinctly masculine feel. In some ways, it “protected” occupations from being inundated by women or becoming “feminized” by excluding women from the schools offering the necessary degree programs or the apprenticeship programs that would have afforded them the needed training and credentials. The vast majority of women were denied acceptance into professional societies in all occupational areas because they were kept in low-paying, invisible jobs, even if they had the necessary qualifications.

Women were often discouraged from working and in some cases laws prevented them from doing so. Marriage bars of the 1900-1930s prevented school districts and firms from hiring married females, because it was determined that as breadwinners men deserved jobs more than women, and caused the firing of single females who announced their intention to marry. During World War I, labor shortages forced the recruitment of large amounts of women into the workforce for temporary employment. Before 1940 more than 80 percent of all married females exited the labor force after marriage, and the majority never returned to work. Because women often stopped working outside the home after marriage or pregnancy, the stereotype persisted that women were transients in the labor force. These factors increased the tendency of employers to channel women, even with degrees and other credentials, into dead-end jobs involving little training and few opportunities for acquiring skills or mobility. These practices helped to create the gender gap in employment.<sup>9</sup>

The 1940s sparked a long-term change in the way females thought about work. During the World War II era, similar to World War I, married women were bombarded with ads convincing them they should support the war effort and enter the labor force. As a result, they began to think of themselves as career owners. By the war’s end, there were 5 to 6 million new

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<sup>9</sup> Claudia Goldin, *Understanding the Gender Gap: An Economic History of American Women* (New York, Oxford University Press, 1990), 4, 5.

female workers in the workforce, and their salaries doubled between 1939 and 1944. For many women this was their first taste of workforce equality, and they desired to have careers, earn their own money, and have the same freedom that men experienced. After 1942, due to a critical shortage of home-front military personnel, females were allowed to become military auxiliaries. They worked as office personnel and typists, although some women piloted planes on local flying duties to make up for the acute shortage of male pilots. Female pilots had stricter requirements – they had to have a high school diploma and 500 hours of flight time while men had to have 3 years of high school and 200 hours of flight time.<sup>10</sup>

The war also sparked a short-term change in the way society thought about women workers. Their roles changed due to the new priorities brought on by the war. The United States government recruited females into non-traditional occupations to fill in for men serving overseas. The image of “Rosie the Riveter” became a popular advertisement for women working to fill labor shortages. They were encouraged to “do their part” in the war effort and work outside the home, many for the first time in their lives. This included work in traditionally “male” occupations. Because of labor shortages, the American public accepted women in technical fields and praised their work as patriotic.<sup>11</sup>

Despite advances in employment, women lost their jobs when the male soldiers returned home from overseas, and men began to reassert their cultural dominance over the workplace. Society determined that men deserved jobs more than women, who should not have career expectations in the first place.<sup>12</sup> The demographics of the female workforce, nonetheless, had

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<sup>10</sup> Pamela Freni, *Space for Women: A History of Women with the Right Stuff* (Santa Ana, CA: Seven Locks Press, 2002), 7-9.

<sup>11</sup> Freni, *Space for Women*.

<sup>12</sup> Freni, *Space for Women*.

changed during World War II and would continue to change thereafter. Female workers were now older, married, had children, and were middle class.

William Chafe recognizes the pattern of World War II as one of two methods of incurring social change. The first is to persuade the public that a given set of values is wrong and must be modified. This process of change regarding woman's place in society usually fails because ideas about feminine roles are deeply rooted societal ideals. It also takes much longer to achieve change via this method. The second method relies on a modification in behavior to compel an adjustment in attitude. This was the force at play during World War II. The revolution in women's economic roles was so extreme that other areas of women's lives, and their ideas about employment, began to transform as well.<sup>13</sup> This idea of change by behavior also occurred in the space industry. As more females entered the male-dominated field of space as a result of EEO laws and increased demand for workers, more men accepted them as colleagues. EEO laws spurred changes in other employment fields as well.

During the 1950s more married women with children entered the workforce. They did so largely to help their families advance economically and to make certain their children gained a college education. Despite the World War II experience, these women understood that they would receive low-paying jobs.<sup>14</sup> Not all people, however, remained satisfied with female's limited employment opportunities. In 1955, during the Cold War era, the White House Conference on the Effective Uses of Woman-power sought to expand women's opportunities in the labor market, by opening employment opportunities for them outside of "traditional" female

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<sup>13</sup> William Chafe, *Women and Equality*, 15, 171-172. William Chafe, *The American Woman: Her Changing Social, Economic, and Political Roles, 1920-1970* (New York: Oxford University Press, 1972), viii, ix, 245-47. Chafe, *The Paradox of Change*, 201

<sup>14</sup> Alice Kessler Harris, *Out to Work: A History of Wage-Earning Women in the United States* (New York, Oxford University Press), ii.

occupations. Additionally, the National Manpower Council, which had been investigating ways to improve the "development and utilization of the country's human resources," published a report in 1957 called *Womanpower*. The Council, recalling the important role women had played in the war industry during World War II, emphasized "the extent to which [the] nation's strength and security [depends] upon its manpower resources." Deploring the nation's failure to utilize women's talents fully, it called for training females in areas long stereotyped as masculine, especially math and science. It argued that the United States needed to utilize all its talents in order to fully compete with the Soviet Union and win the Cold War. Responding to those who argued that education was wasted on future mothers, the Council reported that "the more education [a woman] has, the more likely she is to work." Among women aged 25-64 in 1952, those with only a grade school education had a 30 percent chance of being in the work force, while 37 percent of high school graduates were in the work force. The percentage of female college graduates in the workplace was even higher, at 47 percent.<sup>15</sup>

Despite the popular notion that all married women in the 1950s stayed home to take care of their families in a June Cleaver-type fashion, education and not marital status was the best predictor of whether females would take paying jobs outside the home. Whatever their educational status, however, women as a whole were joining the paid labor force in ever increasing numbers. In this decade the percentage of working wives rose from 21.6 percent to 30.5 percent. During that decade there was also a subtle shift in government policy, which became more supportive of women's capacity to take jobs as well as run the household, because

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<sup>15</sup> National Manpower Conference, *Womanpower, A Statement by the National Manpower Conference, with chapters by the Council Staff* (New York: Columbia University Press, 1957). Rosalind Rosenberg, "Womanpower," *Barnard College*, [http://www.columbia.edu/~rr91/3567\\_lectures/womanpower1.htm](http://www.columbia.edu/~rr91/3567_lectures/womanpower1.htm), 3 October 2004.

many older married females were now in workforce. As well as being a strong traditional period, the 1950s also saw the emergence of the two-income family.<sup>16</sup>

### *Women Scientists through 1962*

Women scientists in America have had particular trouble gaining equality in the workplace. Science is one of the most male-dominated professions, mostly due to characterizations and stereotypes associated with scientists. During the 1800s science was seen as a tough, rigorous, rational, impersonal, masculine, competitive, and unemotional field. This was in direct contrast to the stereotype of female nature, which was seen as soft, delicate, emotional, noncompetitive, and nurturing. Women were viewed as capable of only doing a narrow range of “womanly” activities, and science was definitely not included. In the context of these attitudes, female scientists were seen as either atypical women or suspect scientists.<sup>17</sup>

After the Civil War, higher education opened to women. More females than ever studied science, greatly increasing the number of jobs and professorships open to future generations of female scientists, because women’s colleges initially sought to hire women professors. At first, graduate schools, usually located in men’s colleges and universities or coeducational schools, denied entrance to females or admitted them as special students or exceptions. In the 1870s, graduate schools finally began admitting women as full degree-seeking students. Before 1890 only twenty-five females were awarded science doctorates whereas in the following decade 204 women received doctorates in the sciences.<sup>18</sup>

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<sup>16</sup> Kessler-Harris, *Women Have Always Worked*, 300-301.

<sup>17</sup> Margaret Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins University Press, 1982), xv.

<sup>18</sup> Walter Crosby Eells, “Earned Doctorates for Women in the Nineteenth Century,” *Bulletin of the American Association of University Professors* 42 (1956), 648, quoted in Rossiter, *To 1940*, 31-35.

Gaining access to graduate school was one victory, but a new challenge lay ahead. Even though women received more science degrees and became more involved in the field, they found themselves confined to its lowest levels. Females hired largely as faculty for the women's colleges during the 1880s and 1890s were no longer considered desirable faculty members. Increasingly these institutions and other colleges and universities preferred men since they saw a male professoriate as bringing more prestige and stability to their departments. Women's jobs in science and academia were largely those that were marginal or subordinate, easily downgraded, and rarely accorded recognition. If colleges and universities hired females at all, they brought them in as lecturers or research assistants and created a separate and unequal employment policy for women. Because participation in professional societies was based on visible and often prestigious employment, females were often excluded from membership. That, in turn, made it even harder for them to raise their status so that they could move out of dead-end jobs.<sup>19</sup>

The 1920s and 1930s saw an increase in the number of women scientists but few changes in patterns of sex discrimination. Female scientists still remained clustered at the lowest levels in both higher education and industry doing "women's work" and were underpaid and rarely promoted. Even so, women accepted such jobs because they had no other employment choices. The U.S. federal, state, and local governments provided some haven to small numbers of female scientists, employing 53 women in 1921 and 209 women in 1938.<sup>20</sup>

During World War II and the post-war period the number of female scientists increased greatly. Throughout World War II women scientists and engineers were in very high demand

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<sup>19</sup> Rossiter, *To 1940*, 1, 28, 50, 72, 73.

<sup>20</sup> *American Men of Science*, 3<sup>rd</sup> edition and *American Men of Science*, 6<sup>th</sup> edition. Quoted in Rossiter, *To 1940*, 241.

but were not welcome in all types of work or at high levels.<sup>21</sup> Afterwards, women became more involved in non-traditional fields such as science and engineering. This increase is especially noticeable when one analyzes the available data for the time period. In 1946-47, female engineers numbered 950 out of 317,000 engineers, or a total of .3 percent, and female scientists were 12,460 out of 462,890 scientists, or a total of 2.7 percent. From 1947-61 women received 25 engineering doctorates out of 8,450 that were awarded, or .3 percent, and the number of science doctorates women earned was 4,727 out of 68,091 doctorates, or 6.94 percent. From 1954 to 1962 the number of female scientists and engineers increased dramatically. Between 1955 and 1961 their numbers grew by 76 percent. Still, by 1962 they comprised only 6.78 percent of the total field.<sup>22</sup>

During the 1940s, 1950s and 1960s, many women scientists were underutilized and marginalized, as the societal ideal of the time was to have women at home with their children. “Camouflaged” as housewives and mothers, women scientists were usually located in college towns and cities, often working as laboratory or research assistants if they worked at all. The federal government continued to be one area where women scientists “flourished.” After 1950 it employed many women scientists, including married and minority women. Still, women were

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<sup>21</sup> Margaret Rossiter, *Women Scientists in America: Before Affirmative Action, 1940-1972* (Baltimore: Johns Hopkins University Press, 1995), 2.

<sup>22</sup> *The Outlook for Women in Science*, Women’s Bureau Bulletin 223-1 (1945), 5. United States Office of Education, *Earned Degrees Conferred by Higher Educational Institutions, 1947-48 through 1960-61*, published annually as part of the USOE Circular Series. National Science Foundation, *American Science Manpower, Employment and Other Characteristics, 1954-55, Based on the National Register of Scientific and Technical Personnel, 1954-55* (Washington, DC: Government Publishing Office, 1959.) *American Science Manpower, 1956-58: A Report of the National Register of Scientific and Technical Personnel*. Quoted in Rossiter, *Before Affirmative Action*, 29, 81-82, 98.

segregated in certain fields and agencies, such as the Department of Agriculture, and rarely advanced to higher levels.<sup>23</sup>

It was hard for female scientists to unite and fight for better jobs. Some became angry at their working situations, and this attitude persisted through the birth of the space age. Alice Rossi, a sociologist, was unable to submit a grant proposal to the National Science Foundation under her own name because she was employed as a research associate, the only position she could hold since her husband was also on the staff of the University of Chicago, and anti-nepotism rules forbade the hiring of a married couple. Since husbands usually earned more, it was commonly the wife who had to settle for a position that was marginal and lower paying. A male colleague submitted the proposal on Rossi's behalf, but decided to keep the money and try to do the work himself after the proposal was accepted. Rossi was fired and incensed by the betrayal. She became involved in the renewed feminist movement of the 1960s and began rethinking the current version of men's and women's jobs and roles in society. She found initially that most women were not convinced that they were equal and deserved better jobs and when women scientists lost ground they were usually too afraid to protest.<sup>24</sup>

One factor that helped women start entering technical fields in college was the Soviet Union's launch of *Sputnik*, the first artificial satellite, in 1957, and the subsequent National Defense Education Act of 1958. During the heart of the Cold War the United States was shocked by the Soviet satellite and worried about the consequences of a communist space-faring nation. *Sputnik* had many consequences, including the formation of NASA, as well as inspiring many young people to enter technical fields like engineering. The U.S. feared falling behind in

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<sup>23</sup> Rossiter, *Before Affirmative Action*, xvi, xviii, 277.

<sup>24</sup> Rossiter, *Before Affirmative Action*, 25, 49, 365.

math and science fields and therefore passed the National Defense Education Act. To bolster education, it provided \$575 million for education and low-interest loans to college students, and was designed to stimulate interest in science, mathematics, and modern foreign languages. Both men and women took advantage of this act and it helped increase the number of science graduates during the 1960s.<sup>25</sup>

### *Women in NACA and NASA through 1962*

The history of women in NASA begins with their contributions to NACA, the predecessor of NASA. Women had already established themselves as pioneer engineers, mathematicians, and technicians when President Dwight Eisenhower created NASA in 1958, which took over NACA's responsibilities and field centers.

During the 1940s, NACA's principal facility was Langley Research Center in Hampton, Virginia, along with Lewis Research Center in Cleveland, Ohio. By 1940 there were approximately 100 female employees who mostly performed traditional office functions in jobs such as secretaries, stenographers, typists, mail sorters, payroll and file clerks, telephone operators, and receptionists. In addition to traditional office work, some women worked in technical support roles, such as operating spray guns and welding irons, setting rivets and polishing wind tunnels.

During World War II, more women worked at Langley, especially in non-traditional fields. By 1945, the number has risen to almost 1,000, largely because many men enlisted or were being drafted to fight in World War II. While many females lost their jobs after the war, some remained in their positions and opened doors for other women in non-traditional fields. In general, the females who worked at Langley, during and after World War II, could not advance

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<sup>25</sup> "Summary of Major Provisions of the National Defense Education Act of 1958," Federal Support for University Research, <http://ishi.lib.berkeley.edu/cshe/ndea/ndea.html> (5 November 2004).

as far or as fast as males (even those with inferior talents). Still, most women believed that they had received better treatment from the NACA than they could expect from other employers, perhaps because it was a government organization.<sup>26</sup>

As the need for engineers increased NACA hired more women, who had been encouraged by the federal government and other employers to major in engineering during World War II, to fill in-demand positions. Four female engineers worked at NACA's Muroc unit (now Dryden Research Facility) in 1950. Two of these women, Joan Childs Dahlen and Harriet DeVries, authored NACA reports, a task traditionally accomplished by male engineers.<sup>27</sup>

Many female NASA employees interviewed for this thesis mentioned Virginia Whitehead as a potential interview subject due to her long history in the aerospace field and tenacious personality. As a child, Whitehead decided she would be an astronomer. To accomplish this, she read the requirements needed and later enrolled in Smith College on a scholarship. She says about her interests, "the girls when I was young, didn't want to do what I wanted to do." In college, Whitehead was the only astronomy major at Smith, a prestigious woman's college. That is why she "assumed that women weren't in the sciences, 'cause they weren't doing it."<sup>28</sup>

After graduating, Whitehead worked at an observatory in California, then in Aberdeen, Maryland doing data reduction for the missile business. After six months she went to White Sands Proving Ground (now called White Sands Missile Range) in New Mexico and started a data reduction group. White Sands is an Army facility that supports missile testing and

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<sup>26</sup> Jim Hansen, "Hansen Previews Langley's Early History," *Langley Researcher*, 20 September 1985. From *Engineer in Charge: A History of the Langley Aeronautical Laboratory, 1917-1958*.

<sup>27</sup> *Women in NASA, a chronology* (Kennedy Space Center Archives, Women in NASA File), 1-2.

<sup>28</sup> Virginia Whitehead, interview by author, 27 January 2004, Kennedy Space Center, tape recording.

development for the United States Armed Forces, NASA, and other government agencies. Established on July 9, 1945, it was the site for testing of the V-2 rocket and other missiles. Dr. Wernher von Braun and his team of engineers split time between Huntsville, Alabama and White Sands while developing the United States' first rockets. Whitehead worked there from 1948 to the fall of 1951 with von Braun and his team, and she claims she never encountered any discrimination. The employees she supervised called her "The Great White Mother," and co-workers sometimes referred to her as "that strange Virginia." Her husband, a technician at the same facility, earned a lower salary, but that gave him no problem. At White Sands she managed a group of about 100 people and hired more women. However, when she sent letters to potential employees, Whitehead was careful only to sign her first initial; she did not want anyone shying away from an interview due to apprehension of working for a female boss. After interviewing with her, men never had a problem working for Whitehead, and were grateful that she always sought their promotion whenever they were eligible.<sup>29</sup>

Whitehead exemplifies the idea of female scientists and engineers as being exceptions to the rule during the post-war period. Although women began working in increasing numbers after World War II, most worked in traditional occupations as secretaries, nurses, and teachers. Females were largely discouraged from entering or not even told about scientific, engineering, or mathematical fields. If they were interested, they were always the only females in their classes, and sometimes seen as an aberration. Even when they were accepted, as Whitehead has been during her career, they still carried with them the feeling of being strange or unusual. As the number of women in technical fields increased, however, this feeling declined, making it seem increasingly "normal" for women to be scientists, mathematicians and even engineers.

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<sup>29</sup> Virginia Whitehead interview.

Ideas about women in the labor force, especially in non-traditional fields, prior to 1962 helps one understand why there were so few women technical workers (in the scientific and engineering and technical support fields) at the time of KSC's opening. Societal ideas about women's roles changed dramatically over time and led to the creation of the separate sphere ideology. Females in technical fields, especially scientists, were not accepted, as they worked outside their sphere of influence. As noted earlier, they were considered either unusual scientists or abnormal women, or both. Persistent stereotypes about women workers kept even those with degrees in clerical positions. When they did manage to obtain jobs as technical workers they were such a rarity that they were treated differently from the men and other women employees. During World War II, however, females were recruited to work in technical, traditionally "male" occupations, to fill labor shortages brought on by men going overseas to fight. Although many women were forced to leave their jobs after the war, their employment outside the home began to increase and many women enjoyed their work and some even desired careers of their own. From 1962 to 1972, nonetheless, when affirmative action laws forced a change in female employment, women in non-traditional fields increased their numbers, continuing a post-war trend. This was due to several factors, including new employment laws and government regulation, changing ideas about women and the women's movement, and the greater availability of qualified females. These factors made it more acceptable and easier for women to enter technical fields, leading to a large increase in women scientists and engineers at KSC during its first ten years.

### CHAPTER 3: TOKEN REPRESENTATION THROUGH REGULATION -- 1962-72

During Kennedy Space Center's first ten years, most of the technical employees (scientists, engineers, and technical support workers) in the space business were men. Many female technical workers found themselves mistaken for clerical workers, as the vast majority of women worked in that field. Female technical workers were scarce at KSC throughout the Apollo program. One prominent female engineer, who began her career at Cape Canaveral in 1958 and moved to KSC when it officially opened, was JoAnn Morgan. She worked there until her retirement in August 2003, and eventually became the Director of the External Affairs and Business Development directorate. Morgan was the first female engineer at KSC, and she and a handful of other women had the distinction of being the only female engineers during the Apollo program. During KSC's first decade, however, Equal Employment Opportunity laws, the women's movement, Supreme Court decisions, and other outside factors forced women to receive "token" representation. More women became involved in technical fields during this time. Even though more women worked in fields like engineering, there was still a lack of women in management and no female astronauts.

An examination of NASA employee data from 1969 (the first year such data is available) through the present demonstrates three key trends regarding female employment. First, women were typically employed in occupations classified as clerical and non-professional. Second, they consistently earned a lower salary than males in their occupational group and as a group remained in grades lower than GS-5. Third, female involvement in technical fields slowly increased. This last trend is the most positive but its slow pace demands further examination.

From 1969-1972, the total number of women in NASA's permanent in-house work force remained nearly constant, declining from 5,541 in 1969 (17.5 percent of the total work force) to

4,449 in 1972 (16.2 percent). This decrease occurred in the later parts of the Apollo program, when budget cuts forced the layoff of many employees. Men were more affected by these cuts than women, since NASA was trying to hire more females and minorities. Unfortunately, many experienced male workers at KSC were laid off during this period through the mid-1970s. The percentage of females in the clerical field stayed almost constant, rising slightly from 76.8 percent in 1969 to 77.8 percent in 1972. Women constituted 88.3 percent of clerical workers in this period or the majority of workers in that occupational code group. The percentage of female scientists and engineers also remained fairly constant, declining slightly from approximately 7.4 percent in 1969 to approximately 7 percent in 1972.<sup>1</sup> While the number and percentage of women in technical fields showed little change during this time, new laws sought to end discrimination in hiring on the basis of sex.

The movement of women into non-traditional fields produced not a steady incline but rather a movement, initially at least, of fits and starts. To understand this movement, one must remember how gender affected work and how jobs became stereotyped. The historical division of labor by sex, and the undervaluation of those occupations that have become feminized, makes the workplace a gendered institution. Men, for example, often object to the hiring of women in occupations and professions that they dominate. Not only do they often bring misogynist attitudes towards women, which characterize them as inherently inferior, but men often fear that the presence of women will devalue the prestige and remunerations of their occupation or profession. Thus, organizations do not simply create slots, indifferent to what kind of worker

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<sup>1</sup> Ihor Gawdiak and Helen Fedor, *NASA Historical Data Book Volume IV* (Washington D.C.: NASA History Series, 1994), 104.

fills a particular position. Assumptions about the gender of the worker are embedded in job descriptions, hierarchies, and longstanding workplace practices.<sup>2</sup>

Barbara Reskin and Irene Padavic identify three other kinds of discrimination at work: sex differences in promotions, sex differences in authority, and sex differences in earnings.<sup>3</sup> At KSC, managers have typically been men while women have been promoted to upper management positions less often, partially because women often lack the engineering qualifications desired for the job. (At KSC many higher-level positions require an engineering background as a result of the nature of the Center's work.) Because most women at KSC have worked in low-level positions, men have earned consistently higher salaries than women. To some extent these facts resulted from the small number of women choosing to pursue technical professions.

Discrimination at KSC existed both as unintentional job segregation -- the result of societal beliefs -- and less often as intentional prejudice against females in non-traditional jobs. Unintentional discrimination included the assumption that women performed certain jobs and occurred as a result of attitudes of the time regarding "a woman's place." For example, there were many occurrences of female engineers being mistaken for secretaries because it was assumed that all women at KSC were secretaries. Intentional discrimination occurred much less often and sometimes manifested itself as sexual harassment. One particular situation happened to Jean Grenville, a clerical worker, in 1962, when the chief of her office chased her around the

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<sup>2</sup> Reskin and Padavic, 2, 13. Christine L. Williams, *Still a Man's World: Men Who Do "Women's Work."* (Berkeley: University of California Press, 1995), 180.

<sup>3</sup> Reskin and Padavic, page 31-32.

building and told her he loved her. To stop this, Grenville told him that she would tell her husband, who would beat him up.<sup>4</sup>

Stereotypes of female workers were common because most women at KSC did work in the clerical field, one of the most feminized occupations in America. To understand why women even today remain segregated in certain occupations, one must analyze how those fields are feminized. Examining how job segregation occurs reveals much about stereotypes regarding female workers. Even though the clerical field is now a feminized occupation, it was not always considered “a woman’s place.” Until 1870, most secretaries were men, involved in an apprenticeship in which they learned a trade from their boss, and hoped to rise to or even past his level of employment. From 1870 to 1930, however, profound changes in clerical work led to its feminization. Demand for office workers increased and reorganizations led to the division of labor among departments. Women, who were now the majority of high school graduates and had strong grammatical and spelling skills, and willingly worked for smaller wages, were increasingly preferred as private secretaries. Simultaneously, the private secretary occupation became more of a “personal servant” job rather than an apprentice-type position. After all, it seemed “natural” for a woman to take orders from a man. And as low-level and increasingly female jobs proliferated, clerical workers executed only a small number of tasks.<sup>5</sup>

The invention of office machines, such as the typewriter, also assisted the feminization of office work. A woman typist assigned to these new machines was not doing “man’s work,” and because she often saw herself as a temporary worker, who would leave once she married, she had few expectations for promotion, unless it involved leaving the stenographic pool to become the

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<sup>4</sup> Jean Grenville, interview by author, 10 February 2004, Merritt Island, FL, tape recording.

<sup>5</sup> Margery W. Davies, *Woman’s Place is at the Typewriter: Office Work and Office Workers, 1870-1930* (Philadelphia: Temple University Press, 1982), 3, 163-73.

private secretary to an upwardly mobile male executive.<sup>6</sup> A similar situation occurred at KSC with the introduction of computers to the workplace. According to Melodie Tucker, a contractor employee in the Operations and Processing staff, women who familiarized themselves with computers often advanced more rapidly than other clerical workers, partially because some male technical workers refused to work on a computer.<sup>7</sup>

Women who worked in the clerical field at KSC performed a variety of important duties. Career secretaries such as Jean Grenville, who was at one time the secretary to the Chief of Shuttle Operations, kept offices functioning and provided support during hectic launch periods. Many articles in *Spaceport News* explained how clerical workers made the space program possible. For example, in 1964 the newsletter proclaimed that “Better secretaries mean better business.” Without them, technical workers would not be able to perform their jobs to the best of their abilities, because they “daily perform an interminable number of important time consuming functions which free the managers, engineers, and scientists to concentrate more fully on their work.”<sup>8</sup>

Although many women went to work outside the home during the 1960s, nearly all growth was in the clerical and service sectors, which were well-known as “women’s work.” By 1960 nearly 80 percent of wage-earning women worked in jobs that were stereotyped as female, including teaching and nursing.<sup>9</sup> And while Americans did not have reservations about working

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<sup>6</sup> Davies.

<sup>7</sup> Melodie Tucker, interview by author, 4 February 2004, Kennedy Space Center, FL, tape recording.

<sup>8</sup> “Lest We Forget,” *Spaceport News*, 16 April 1964, 1, 2.

<sup>9</sup> Reskin and Padavic, page 302.

women, some *did* have reservations about married women with small children working outside the home, as well as women “taking away jobs from men.”<sup>10</sup>

As the roles of women changed, the Federal government worked to assess and improve their situations in all arenas. In 1961 President John F. Kennedy established a Commission on the Status of Women, with Eleanor Roosevelt as its chairperson. The Commission, presented its report, *American Women*, to President Kennedy on October 11, 1963, and indicated that the percentage of women workers was rising, and that a majority of women who worked outside the home were married. Since the percentage of women workers in the overall paid labor force had increased from 27 to 32 percent between 1950 and 1960, the Commission estimated that in 1970 women would make up 34 percent of the workforce. Moreover, women wage-earners were getting older. In 1950, 25 percent of women over age 45 worked, a percentage that had risen to 30 percent by 1960. The profile of the female wage earner had changed in another way -- no longer was she predominantly single. In 1962, 60 percent of women in the workforce were married.<sup>11</sup>

The Commission also reported on the working situations for women. The largest concentration of women, 71 million, was in the clerical field, according to the 1960 census. The census also noted that most women held low-paying jobs, and some occupations, such as nursing and household work, were almost entirely staffed by women. Not surprisingly, women earned lower annual salaries than men. The average female salary, \$1,000 in 1950, had risen to \$1,500 in 1960. Men, however, earned an average of \$2,500 in 1950 and \$4,000 in 1960.

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<sup>10</sup> Kessler-Harris, *Women Have Always Worked*, 143.

<sup>11</sup> Margaret Mead and Frances Bagley Kaplan, *American Women: The Report of the President's Commission on the Status of Women and Other Publications of the Commission* (New York: Charles Scribner's Sons, 1965), 27, 46, 47.

This discrepancy carried over to the civil service, where most women worked in lower grades than men. The General Service, or GS, pay plan is organized by education and skill level. Most government employees classify themselves based on their GS-level. With a high school diploma, one can qualify for a GS-2 level, and can move up to a GS-3 or GS-4 with a few months of specialized experience. One can start as a GS-7 with a college degree and a “B” average, or a GS-9 degree with a master’s degree and a GS-11 level with a doctorate degree. With specialized experience, a person with a four-year degree can receive promotion beyond a GS-7 level.<sup>12</sup> Employees can move to higher grades in one position if they increase their skills or perform exceptionally well, but can only move so high without changing jobs or getting advanced degrees. As of October 1961, approximately 54 percent of classified female workers were in grades 3 and 4, and 27 percent were in grades 5-6. In 1962, the Distribution of White-Collar Civil Service Workers showed that the highest number of men, 94,034, was in grade 11, while the highest number of women, 126,676, was in grade 4.<sup>13</sup>

The compilation of the Commission’s findings was the first phase in improving the situation of American women. Even before the Commission finished the report, the second phase -- action on the federal level --began. President Kennedy established an Interdepartmental Committee on the Status of Women and a Citizens’ Advisory Council to ensure that work done by the Commission would be continued. After Kennedy’s assassination, his successor, President Lyndon Baines Johnson, initiated a search for qualified women to fill posts made by presidential appointment. By June 1964 he had appointed fifty-six women to such positions. The states,

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<sup>12</sup> USAJOBS, “Frequently Asked Questions,” USAJOBS – The Federal Governments’ Official Job Site, <http://www.usajobs.opm.gov/> (9 November 2004).

<sup>13</sup> Mead and Kaplan, 46, 50, 56, 123.

national voluntary organizations, and local committees took on the third phase of implementation, which was to replicate the national work at the lower levels.<sup>14</sup>

*Spaceport News* is an excellent source to determine NASA's official attitudes towards women. It is also helpful in determining the status of women at KSC when the Center first opened and how their status correlated with the overall situation of women in American society. In examining the newsletter one sees many stereotypical portrayals of women that emphasized the ideals of the time concerning working women: they were women first, workers second. The newsletter often referred to them as "gals," "girls," "ladies," and other terms, and described women by using adjectives such as "pretty" and "likeable." An article from 1963, telling the reader about early settlers of Brevard County, described a secretary as "pretty Joy Taylor" and a "NASA girl."<sup>15</sup>

There were also numerous photographs of smiling women performing their jobs, demonstrating safety issues, touring the Center, and even having fun at the beach. A photograph showed "pretty Jean Myers," a secretary, as one of the winners of the Miss 217<sup>th</sup> Communication Squadron beauty contest. The same issue contained a picture of the Manned Spacecraft Center's "new and smiling receptionist," Bonnie Morlan, who was depicted as "blonde, 5 foot 5 inch tall."<sup>16</sup> The newsletter also showed "Lovely Louise Brooks" demonstrating the ease and convenience of seatbelts.<sup>17</sup> The most surprising (and possibly offensive) photograph was actually a series of pictures of "lovely red head" Evelyn Schwartz of the Technical Library staff. The newsletter showed her ushering in the first day of spring with "an enthusiastic game of catch

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<sup>14</sup> Mead and Kaplan, 5.

<sup>15</sup> "NASA Girl's Family MILA Pioneers," *Spaceport News*, 7 March, 1963, 1, 6-7.

<sup>16</sup> *Spaceport News*, 29 May 1963, 7-8.

<sup>17</sup> "Lovely Louise Brooks," *Spaceport News*, 25 April 1963, 3.

in the surf.” The caption offered a scientific explanation of why seasons change, and said that if seasons did not change then they “wouldn’t have had any reason to run the pictures of Evelyn.”<sup>18</sup> Today, it is impossible to imagine publishing a similar photo spread without offending many people.

In its pages *Spaceport News* revealed other trends at work as well. In this era one can see KSC’s early desire to recruit women employees and support female students’ interest in technical careers. However, females in technical careers still had to be feminine. In 1963 Ann Virginia Welly won the Seven Astronauts’ Scholarship, a competition open to outstanding Brevard County high school seniors interested in pursuing the study of biological sciences or engineering at the college level. While the article about her achievement described her interest in science, it also stated that she maintained her extra-curricular activities. The newsletter quoted Welly as saying, “I still have time for dates. In fact, my parents have a hard time keeping me home to study. I crack the books, but I still manage to get in a lot of fun.”<sup>19</sup>

As previously stated, women occupied the majority of low-level positions. In fact, most women at KSC worked in low-level positions such as clerks. Men, on the other hand, usually functioned in higher-level occupations and occupied the majority of supervisory positions. This sexual division of labor was perpetuated by social ideals as well as the media, including

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<sup>18</sup> “Head For the Beach...Spring is Here!” *Spaceport News*, 21 March 1963, 3.

<sup>19</sup> “7 Astronauts’ Scholarship Won by Ann Virginia Welly,” *Spaceport News*, 28 March 1963, 6.

I have some affinity for this article, as I received the same treatment in an article when I was in middle school. A local newspaper wrote an article about me and three other students (all male) because we had received straight As all through middle school. The article discussed all of our interests outside of school, but for my part of the article the reporter focused more on one comment I had made about my dad telling me that boys did not like me because I was smart. The article made me angry because it portrayed me as caring more about the fact that boys did not like me than my good grades in school.

*Spaceport News*. An issue from 1964 contained a photograph of four Cape Kennedy<sup>20</sup> area “ladies” sitting poolside in St. Ann, Missouri, “for a game of bridge and talk.” These women were wives of KSC workers who were temporarily stationed at the McDonnell contractor plant in St. Louis, where the Gemini capsules were designed and built. The picture showed them in bathing attire, enjoying the weather and each other’s company. The photograph implied that while men worked, women enjoyed leisure time (in bathing suits, no less).<sup>21</sup>

The portrayal of women in *Spaceport News* was consistent with the portrayals of women in contemporary magazines. The Original Mercury 7 astronauts had an exclusive contract with *Life Magazine* to carry many articles about astronauts and their wives. The magazine portrayed the astronaut wives as doting, nervous, caring only about their families, and anxiously awaiting their husbands’ safe returns from space. They were the perfect wives for husbands with “the right stuff.” This attitude, of women as doting wives and mothers, carried over into other contemporary articles. A March 23, 1962 article about working women in Washington, D.C. was titled “How Nice to Be a Pretty Girl and Work in Washington.” In the *Life* index for 1962, “women” had an unusual subheading: “see also ‘actors and actresses,’ ‘beauty contests.’” One can infer that women worth noting were either beautiful or famous movie stars. Finally, an advertisement for magazines mirrors the characterization of astronauts in *Spaceport News*. The ad pictured a father and son walking through a field, the son playing with a model airplane. The headline stated boldly, “ASTRONAUTS.” The text stated, “This is the stuff that dreams are made of...the father thinks he might make the moon. The son *knows* he’ll get to the stars.”

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<sup>20</sup> President Lyndon B. Johnson renamed Cape Canaveral, the land near the Cape Canaveral Air Force Station and Kennedy Space Center, in 1963 after the assassination of President John F. Kennedy. Residents of the newly-named Cape Kennedy were not pleased, as Cape Canaveral was not only a geographic area but also the name of a town. The name reverted to Cape Canaveral in 1973.

<sup>21</sup> *Spaceport News*, 9 July 1964, 2.

While there were some portrayals of female astronauts during the 1960s, the idea of a woman astronaut in the 1960s and early 1970s was similar to that of a women scientist in the 1800s – she was a contradiction in terms.<sup>22</sup>

As it was, not only did society deem that women could not be astronauts, but they were officially ineligible for consideration by NASA. The first astronauts were all required to be test pilots, and because women were not allowed to be test pilots in the military, they were immediately disqualified as applicants. During the selection process, the male astronaut candidates endured a variety of physical and mental tests that took place at the Lovelace Foundation in Albuquerque, New Mexico and the Wright Air Development Center's Aeromedical Laboratory at Wright-Patterson Air Force Base in Dayton, Ohio. Seven astronauts were selected and became known as the Mercury 7 -- Scott Carpenter, Gordon Cooper, John Glenn, Gus Grissom, Wally Schirra, Alan Shepard, and Deke Slayton. Dr. W. Randolph Lovelace II, who ran the clinic and Brigadier General Donald Flickinger of the Air Force helped design the medical testing procedures for the astronaut candidates. Both Lovelace and Flickinger were interested in testing women for potential spaceflight and theorized that females might offer some advantages over males as astronauts.<sup>23</sup> They disagreed with the popular consensus that women were unable to perform the duties required by an astronaut and would not pass the same examinations as male astronaut candidates. To gather information about potential female astronauts, Lovelace invited eighteen women pilots to his clinic to undergo the same physical tests as the male astronaut candidates. Thirteen women passed the tests and Lovelace arranged

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<sup>22</sup> "Astronauts" advertisement. *Life*, 2 November 1962.

<sup>23</sup> Women's lower body weight might make them better human cargo for American rockets, as each pound in the spacecraft necessitated more booster power. Also, greater human weight required a greater oxygen supply and more food.

more tests, the second round at the Oklahoma City Veterans Hospital for psychiatric and psychological exams, and the third round at the U.S. Naval School of Aviation Medicine for spaceflight simulation tests. The Pensacola tests, however, were abruptly cancelled right before their scheduled date.

Although Lovelace's tests revealed surprising results about women's ability to perform up to par with male pilots, they were not sanctioned by NASA and the agency had no desire to add women to the astronaut corps. Newspapers across the country ridiculed the idea of women astronauts. President Lyndon Johnson wrote about the women's astronaut program, "Let's Stop This Now!"<sup>24</sup> Excuses about why women should not be astronauts varied. At a House Subcommittee on Science and Astronautics, NASA officials, including astronauts Scott Carpenter and John Glenn, testified that NASA could not dedicate adequate time to testing and training women astronauts, and that NASA was merely following the social order of the time. Other NASA officials were downright sexist, saying that female astronauts would eventually be used as recreational equipment.<sup>25</sup> As the women's movement and civil rights movement progressed, NASA officials became willing to admit that their record for bringing women into upper-level positions was poor. Finally, in the late 1970s NASA Administrator James Fletcher announced that "full consideration" would be given to minority groups and women for the new shuttle program.<sup>26</sup>

The story of the "Mercury 13," as the women who passed the Lovelace tests became known, demonstrates the innate sexism prevalent in American culture before the women's

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<sup>24</sup> Martha Ackmann, *The Mercury 13: The True Story of Thirteen Women and the Dream of Space Flight* (New York: Random House Trade Paperbacks, 2003), 148.

<sup>25</sup> Ackmann, 173. This quote was attributed to Bob Gilruth and repeated often by Wernher von Braun.

<sup>26</sup> Ackman. Bernice Trimble-Steadman and Jody Clark, *Tethered Mercury - A Pilot's Memoir: The Right Stuff...But the Wrong Sex* (Traverse City, MI: Aviation Press, 2001).

movement. Following that trend, *Spaceport News* did not even mention the future possibility of female astronauts and used language that led one to believe that only men could be astronauts. For example, a questionnaire asked workers “Your son an astronaut? Would you encourage it?” The workers stated that they would like their sons to be involved with the space program and even see them as astronauts. However, no workers raised the possibility that their daughter might become an astronaut.<sup>27</sup> The idea that women could be astronauts and aviators threatened the traditional idea of a happy homemaker. The popular opinion of the time was that women could not and should not be astronauts for the foreseeable future.

In 1963 the newsletter dedicated an entire issue to women’s roles in space. The editorial stated that “there are many space-related careers open to women, with the sole job requirement being merit rather than sex.” It explained that all jobs were important in the space business, especially clerical positions, because “carrying out these duties [relieves] her boss so he (or *she*<sup>28</sup>) may concentrate on more important matters.” While the editorial surprisingly indicated that women could be supervisors, the use of the pronoun “her” to describe a secretary showed that only women were clerical workers. It went on to say that “regardless of the job filled...each woman is performing functions needed to keep the overall organization moving smoothly.” The article “U.S. Space Program Open to Women” also explained that there were many opportunities for women throughout the developing space program, except in outer space. It emphasized that NASA requirements for women scientists were exactly the same as for men, and that merit was the only qualification needed for such occupations.<sup>29</sup> According to the newsletter, women were

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<sup>27</sup> “Your Son an Astronaut? Would you Encourage It?” *Spaceport News*, 15 September 1966, 2.

<sup>28</sup> Italics mine.

<sup>29</sup> “Women’s Role in Space,” *Spaceport News*, 20 June 1963, 2. “U.S. Space Program Open to Women,” *Spaceport News*, 20 June 1963, 5.

very important to the space program in every capacity they could fill. Still, they remained a part of the support staff. The most exciting and glorified position, astronaut, was out of their reach. They were also left out of upper-level management positions.

Much of the reason for the public's aversion to female astronauts was the idea of the male astronaut hero made popular by the space flights of Alan Shepard and John Glenn. Shepard became the first American in space in May 1961, making a fifteen-minute suborbital flight. Less than a year later Glenn became the first American to orbit the earth in February 1962. Shepard and Glenn received incredible amounts of publicity in magazines like *Life* after their space missions and became instant heroes known to everyone in the country. The public saw them as all-American men committed to serving their country in a way that women, who were inherently weaker, could not. Even though the Mercury 13 proved that women could pass the same tests as men and at times even surpass their performances, the idea of the male astronaut hero was imbedded in the American psyche and it would be over a decade until female astronauts were accepted.

While NASA was closed-minded to the idea of female astronauts, the Soviet Union was more open and saw another opportunity to beat the United States at a "space first."<sup>30</sup> The Soviet space agency launched Valentina Tereshkova, the first female to travel into space, on June 16, 1963, aboard *Vostok 6*. During her flight she made forty-eight orbits and spent more time in space than all the Mercury 7 astronauts combined, almost seventy-one hours. Tereshkova was one of five women selected by the Soviet Union to train as cosmonauts in 1962, but she was the only one to make a space flight. The female cosmonaut program disbanded in 1969, and another woman did not fly in space until 1982 when Soviet cosmonaut Svetlana Savitskaya flew a Soyuz

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<sup>30</sup> Yuri Gagarin became the first man in space and the first man to orbit the earth in April, 1961, beating Shepard who flew the following month.

mission. Although many speculate that Tereshkova's flight was mainly for propaganda purposes and a chance for the Soviet Union to pull farther ahead of the United States in the space race, it is telling that it took twenty years for the United States to catch up and finally launch its first female astronaut.

As previously noted, women working at KSC during its early years were often in low-level positions. Throughout the 1960s and into the 1970s, however, there were several important laws that would increase the opportunities for all women workers at KSC. The Equal Pay Act of 1963 (EPA) protects men and women who perform substantially equal work in the same establishment from sex-based wage discrimination. The law, which applies to employers engaged in commerce or in the production of goods for commerce, states that:

No employer having employees subject to any provisions of this section shall discriminate, within any establishment in which such employees are employed, between employees on the basis of sex by paying wages to employees in such establishment at a rate less than the rate at which he pays wages to employees of the opposite sex in such establishment for equal work on jobs the performance of which requires equal skill, effort, and responsibility, and which are performed under similar working conditions.<sup>31</sup>

The EPA prohibited NASA from paying women who performed similar duties less than their male counterparts. It also gave female technical workers more legitimacy in their occupational choices. Under the new wage law, women and men were equal, regardless of their profession.

Title VII of the Civil Rights Act of 1964 is perhaps the most important law regarding women's employment. It prohibits employment discrimination based on race, color, religion, sex, and national origin, and was the first piece of American legislation to prohibit sex discrimination across all facets of employment. Under Title VII employers can not fail or refuse to hire, fail or refuse to refer for employment, and otherwise discriminate on the basis of race,

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<sup>31</sup> The U.S. Equal Employment Opportunity Commission, "The Equal Pay Act of 1963," The Equal Employment Opportunity Commission Website, <http://www.eeoc.gov/policy/epa.html> (17 September 2004)

color, religion, sex or national origin. Most important to women at KSC was the following stipulation that made it illegal for an employer

to limit, segregate, or classify his employees or applicants for employment in any way which would deprive or tend to deprive any individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion.<sup>32</sup>

No longer could employers segregate women into certain employment areas. Women were also to receive the same possibilities for advancement as males with their same qualifications. The latter directive was especially helpful to female technical workers who often found themselves consigned to lower positions than their male co-workers and offered fewer opportunities for promotion.

The Equal Employment Opportunity Commission (EEOC) was created a year later on July 2, 1965, to oversee the implementation of Title VII guidelines and to eliminate illegal discrimination in the workplace. Although at first the EEOC had a hard time enforcing Title VII, the Equal Employment Act of 1972 provided the Commission with litigation authority to back up its administrative findings and to expand the Commission's jurisdiction. The EEOC could also sue non-government respondents if the agency could not secure an acceptable conciliation agreement, and charging parties received more time to file charges. The act lowered the number of employees a business must have in order to be covered by Title VII from 25 to 15, and subsequently increased the number of employers subject to Title VII's rules.

Even though changing laws offered women more freedom in the workplace, they still encountered longstanding prejudices at work. These prejudices hurt women because employers often assumed that they were not reliable workers, and therefore did not train them as much as

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<sup>32</sup> The U.S. Equal Employment Opportunity Commission, "Title VII of the Civil Rights Act of 1964," The Equal Employment Opportunity Commission Website, <http://www.eeoc.gov/policy/vii.html> (17 September 2004)

male coworkers and did not promote them to higher levels. In 1964, *Spaceport News* discussed a Civil Service Commission study that contradicted such popular assumptions about women workers at the time. For example, women did not take excessively more sick leave than male employees. Women did not have higher turnover rates than males, as the turnover rate of federal employees was more closely associated with age groups, occupations, and grade levels, and not related to sex. Instead of being “distracted” by the needs of the home, moreover, women participated in the same number of career activities as men, and sometimes more. Contrary to the popular belief of the time that women did not like to work for female bosses, the study stated that women liked working for bosses of either sex, while men usually liked having only male supervisors. This study also offered these insights on the status of women in 1964. Noting that they were “employed in a wide variety of occupations,” it added that most were “predominantly in the lower salaried, nonprofessional, white-collar positions.” Their average salary grade was GS-4 while the average for men was GS-9.<sup>33</sup> Obviously, it would take more than legislation to expand opportunities for women.

Outside organizations also began assisting working women at KSC. The National Organization for Women (NOW) was created in 1966 “to take action to bring about equality for all women.”<sup>34</sup> One of NOW’s intentions was to force the EEOC to focus more on the situation of women and to take more action to eradicate sex discrimination in the workplace. Executive Order 11246, issued on September 28, 1965, had sought to strengthen EEOC laws by prohibiting government contractors from discriminating on the basis of race, creed, color, or national origin,

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<sup>33</sup> “Civil Service Commission Studies Set Record Straight on Status of Working Women,” *Spaceport News*, 9 January 1964, 4-5.

<sup>34</sup> National Organization for Women, “The History of the National Organization for Women,” NOW History, <http://www.now.org/history/history.html> (17 September 2004)

but *not* sex. However, on October 13, 1967, in one of NOW's earliest victories and one significant for KSC due to its large number of contracted employees, Executive Order 11375 added sex to this list of unacceptable forms of discrimination. Women who worked for contractors were now protected by the same laws as female NASA employees. A year later, a group of female civil servants formed the Federally Employed Women's group, or FEW, to carry out the intent of the executive order. FEW's mission statement was to work "toward better employment and advancement opportunities for women in the federal government."<sup>35</sup> In 1970, Space Coast became the 9<sup>th</sup> chapter of FEW with 17 members, formed to help female Civil Service personnel reach their job potential.

The EEO Office established more programs to help women's situations at KSC. The Federal Women's Program (FWP) was established in 1967 after Executive Order 11375 added sex to other prohibited forms of discrimination in the Federal Government, and exists at all federal agencies. The FWP and other Special Emphasis Groups assist the EEO office by aiding in recruitment activity, reviewing statistical information on minorities and women, and making suggestions for management.<sup>36</sup> Its objective is to implement initiatives that will increase the number of females in the NASA workforce, commensurate with their numbers in the national workforce, particularly in science and engineering fields and at senior levels, and help to ensure equity in promotions, awards, and all employment related actions. Since 1969, when Executive Order 11478 integrated the FWP into the overall EEO program, it has operated under the EEO office.<sup>37</sup> KSC's appointed its first Federal Women's Program manager in 1968. NASA hired its

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<sup>35</sup> *Spaceport News*, 9 March, 1974, 8.

<sup>36</sup> KSC Equal Employment Opportunity Office, "Special Emphasis Groups," Special Emphasis Groups at the Kennedy Space Center, [http://www.ksc.nasa.gov/nasa-only/eo/special\\_emphasis\\_groups.html](http://www.ksc.nasa.gov/nasa-only/eo/special_emphasis_groups.html) (1 July 2003).

<sup>37</sup> NASA Equal Employment Opportunity Office, "Federal Women's Program." <http://www.hq.nasa.gov/office/codee/fedwomen.html#strategic> (9 November 2004).

first agency-wide Federal Women's Program manager in 1972 to help implement an affirmative action program for women. In 1973 Mae Walterhouse became the first full-time FWP manager.

In 1968, KSC Center Director Kurt Debus appointed Mary King as the first FWP manager, whose responsibility would be to monitor women's positions at KSC.<sup>38</sup> Her full-time position was as a Personnel Staffing Specialist, and she spent about twenty-five percent of her time working on the FWP. King's goal was to utilize "existing programs to advance the status of women" and "to create new avenues for advancement."<sup>39</sup> According to her job description, King developed plans and activities for publicity and support of the organization to insure consideration of full utilization of skills available.<sup>40</sup> She was very effective in recruiting and placing women with engineering or science degrees in professional positions at KSC.<sup>41</sup> King helped start the Specialty Training for Entry Professionals (STEP) program, which helped both men and women move up in professional administrative jobs. She recruited at the Society of Women Engineers (SWE) conferences and all colleges with engineering degrees. King would encourage women with scientific math degrees to apply for data systems jobs, which only required two engineering labs instead of a degree. When King saw that one woman who applied for a clerical job at KSC had a math degree, King informed her that if she took two engineering labs at the local community college, she would be eligible for one of the data systems jobs. No

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<sup>38</sup> Kurt H. Debus, "Equal Employment Opportunity for Women," *United States Government Memorandum* (4 October 1968).

<sup>39</sup> "KSC Emphasizes Federal Women's Program," *Spaceport News*, 25 January 1973, 2. Federal Women's Program Working Group, "Overview," Federal Women's Program and Equal Employment Opportunity Homepage, <http://fwp.ksc.nasa.gov/FWP/default.htm> (17 September 2004). FWP managers and representatives are selected by their Federal managers and representatives and advise management on the special concerns of women and ensure that agency's affirmative action plans are designed to eliminate barriers to full employment of women at all levels and in all occupations.

<sup>40</sup> NASA Position Record, Position Number 9050, NCC 631-002, October 1970.

<sup>41</sup> KSC Document - Recommendation for Superior Achievement Award, Intangible Benefit, High Value - Limited Scope Award.

NASA centers had problems recruiting during the 1960s since NASA was the cutting edge among the aerospace industry. King says that there were plenty of qualified women to hire, “you just had to know where to look.”

Although King declares that she did not personally face objection from management over the recruitment of women, she did face some negative responses as EEO workshops. During a break, one supervisor loudly stated, “we all know a woman’s place, pregnant and at home.” Instead of getting angry, King resumed the workshop by appealing to the supervisors’ parental concerns. She knew that many of them had college-age daughters and would be upset if they were to be discriminated against in the workplace. King told the supervisors that their attitudes would enable persisting stereotypes to hurt their daughters’ employment possibilities, and she believes this appeal was effective in changing their mindsets. She also faced overt discrimination concerning the issue of business travel. King was not allowed to go on college recruiting trips when she was first hired at KSC in 1965, because, she says, some of her co-workers’ wives were jealous and did not want her traveling with their husbands.<sup>42</sup>

Another reason for the increase of female engineers was the growing Apollo program, which officially began on May 25, 1961, when President Kennedy called for a lunar landing by the end of the decade. The mad rush to meet his deadline, especially after his assassination, called for the recruitment of a heavy workforce which included females. The labor force for Project Apollo was immense, at some points reaching up to 500,000 workers. Women were a new and increasingly sizable workforce during the Apollo program.

Despite these attitudes, during the 1960s and early 1970s female technical workers made many advances at KSC. This occurred for several reasons. First, the previously discussed legal revolution in women’s employment rights, as well as an increase in the number of women

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<sup>42</sup> Mary King, interview by author, Cape Canaveral, FL, 16 November 2004, tape recording.

obtaining technical degrees, helped increase the number of female technical employees. Second, women scientists and engineers began to come together to form their own women's movement within their field from 1968-1972. They signed petitions, formed caucuses and consciousness-raising groups, joined marches, wrote checks to reform-minded groups, collected data and prepared reports, and worked for institutional reform. Formerly isolated women came together, empowered and ready to help females in the sciences. Finally, the women's movement and books such as Betty Friedan's *The Feminine Mystique*, a best-selling work, which helped change social views about "a woman's place."<sup>43</sup> All these factors combined to lead to the increased employment of women at KSC and other NASA installations, especially in technical fields.

The newsletter also demonstrated that more women became interested in and involved with technical fields during the 1960s. An article entitled "Engineering No Longer Solely A Man's Domain" stated, "Qualified career women today hold a number of key positions in engineering and related areas." Through college education, an increasing number of women were becoming qualified in professional fields, particularly mathematics, thereby broadening the pool of potential employees.<sup>44</sup> According to Janie Callahan, a mathematician in KSC's Flight Safety Office, "The Space Program has really opened the doors of opportunity in the technical field, as far as women are concerned." Because of the high demand for workers during the Apollo program, and the increasing numbers of qualified women, women were able to "show their stuff" in fields once considered a man's domain.<sup>45</sup>

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<sup>43</sup> Rossiter, *Before Affirmative Action*, 361.

<sup>44</sup> "Engineering No Longer Solely A Man's Domain," *Spaceport News*, 25 February 1965, 4.

<sup>45</sup> "Space Has Opened Doors For Qualified Women," *Spaceport News*, 5 January 1967, 6.

The *Spaceport News* continued to discuss unconventional women in technical fields, showing that more women were entering such occupations, but it still emphasized their femininity and attempted to relate their occupations to the traditional woman's sphere. Some examples of this are the headlines "Meet LOC's Likeable Lady Lawyer",<sup>46</sup> "Spaceport's Prettiest Civil Engineer Enjoys Varied Challenges of Her Job",<sup>47</sup> "Feminine Touch, Hard Work Spell Success",<sup>48</sup> and "Cherie Likes Math, Music."<sup>49</sup> These headlines indicate the social ideals of the time regarding female employees. They were accepted in technical occupations but still expected to be feminine – they were women first, workers second.<sup>50</sup> In articles about female technical workers, *Spaceport News* also discussed their hobbies, such as sewing and cooking, to appeal to readers.

In 1967, NASA suffered a tremendous loss when the Apollo 1 crew was killed during a plugs-out test, or a dress rehearsal for their upcoming launch, on January 27, 1967. A spark caused the cabin, pressurized with one hundred percent pure oxygen, to go up in flames, and the three astronauts -- Gus Grissom, Ed White, and Roger Chafee -- died from asphyxiation. NASA and its contractors spent the next year and half fixing the Apollo capsule and preparing for the

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<sup>46</sup> *Spaceport News*, 20 June 1963, 4. Kennedy Space Center was named the Launch Operations Center until after President Kennedy's assassination in November, 1963. It was renamed a week after his death. Sue Weissenegger was an attorney for KSC.

<sup>47</sup> *Spaceport News*, 25 February 1965, 4. Jeannette Denny worked in the Planning and Resources Office.

<sup>48</sup> *Spaceport News*, 11 April 1968, 3.

<sup>49</sup> *Spaceport News*, 18 July 1968, 7. Cherie Lee was employed in the Automation and Programming Office, Launch Vehicle Operations. She worked in the Vehicle Assembly Building and when asked if it was a man's world inside, she responded negatively and said that there are two women engineers in her office.

<sup>50</sup> Women workers during World War II also received similar treatment as female technical workers at KSC during the 1960s and 1970s. The press was curious about women workers, but instead of writing about their talents, they wrote about subjects deemed readable by the public, such as women's uniforms. Pamela Freni, *Space For Women: A History of Women with the Right Stuff* (Santa Ana, CA: Seven Locks Press, 2002), 7.

next manned flight, Apollo 7. Most importantly, the agency did not want to lose sight of President Kennedy's goal and let the three astronauts die in vain.

Through the 1960s and early 1970s *Spaceport News* continued to print stereotypes concerning the sex of higher-level workers. This is surprising considering the headway women were making in non-traditional fields. In 1967 and 1968 the *Spaceport News* published articles about ceremonies held to thank the wives of KSC workers for their contributions to the space program. At a tea honoring wives of KSC managers, Dr. George Mueller, NASA's Associate Administrator for Manned Space Flight, thanked them for "helping their husbands achieve 'one of the most professional demonstrations by a launch crew that I have ever witnessed'" [regarding the Apollo 4 mission, the first unmanned test flight of the Saturn V rocket].<sup>51</sup> The following year, at the fifth annual tea honoring wives of KSC managers, Dr. Mueller thanked the wives for their unique contributions to the space program. "I know your husbands have been working hard," he stated, "and I know the only reason they work hard is because their wives help them."<sup>52</sup> These articles are interesting for a few reasons. First, the language used demonstrates that at that time only heterosexual men were managers. Second, the idea that women were at home taking care of the household while their husbands were at work was still prevalent. Third, women were still judged by their husbands' success and their family life. This eventually changed at KSC, but the ideas did not erode quickly. The thanks from Dr. Mueller emphasized this ideal, but also show an appreciation for the work done to maintain the household so husbands could immerse themselves in the Apollo program.<sup>53</sup>

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<sup>51</sup> "Mueller Thanks Wives," *Spaceport News*, 23 November 1967, 1.

<sup>52</sup> "Dr. Mueller Lauds and Thanks Wives of KSC Managers For Their Contributions to Nation's Space Program," *Spaceport News*, 5 December 1968, 2.

<sup>53</sup> Kessler-Harris, *Women Have Always Worked*.

Nonetheless, changes were occurring beneath the surface. As more women majored in technical fields in college KSC needed new ways of recruiting this new labor force. The cooperative education (co-op) program, in which students alternate semesters of full-time college classes with full-time work, is one method KSC began using for recruitment. To qualify for the co-op program, a student must attend a four year college or university on a full time basis, have a 2.9 GPA, enroll in their college or university's Cooperative Education Program, maintain good academic standing, be recommended for co-op assignment by their school's co-op office, schedule a minimum of three work tours, alternated with full-time terms of school, be a U.S. citizen, and have completed 30 semester hours or 45 quarter hours. Interested students may apply through their schools co-op office. KSC has agreements with and specifically recruits through several schools, but students may apply though their school's co-op office even if they attend an institution that does not have an agreement with KSC.

Not only does the co-op program help KSC in job recruitment, it also helps students determine their career goals. By working in areas of interest, students can learn more about potential fields and job availabilities. While KSC mostly recruits engineering students, it also searches for students in human resources management, management, and public administration. At KSC it is not uncommon for co-op students to receive a full-time position upon graduation. The co-op program has been an excellent tool for recruiting college graduates of diverse backgrounds. In fact, several females interviewed for this project, including Stephanie Stilson, Cassie Blum, Joylene Hall, Diana Calero, Lisa Malone, and Stacie Smith all worked as co-op students while in college.

*Spaceport News* focused on co-op students, especially in later issues. Early on, the descriptions of co-op students were typical of other early articles about female workers. In 1963

a photo caption described Ann Hauswald, who worked in the cooperative education program as a trainee in statistics in the Program Coordination and Planning Branch, as “vivacious.” A photograph showed her smiling at a desk, although there was no sign of anything math-related in her surroundings (in fact, it looked as if she was a secretary). The caption specified Hauswald as “the only girl in the group of 16 students in the program.”<sup>54</sup> However, a later article in 1968 about co-op student Elaine Reaves said nothing about her gender or, more surprisingly, her race (the photo indicated that she is African-American). While the article did mention a few of her hobbies, it focused mostly on her work.<sup>55</sup> This trend continued into the 1970s.

In 1969, NASA fulfilled President Kennedy’s goal of landing men on the moon and returning them safely to the earth. At that moment, the world seemed united as nearly everyone watched Neil Armstrong’s first steps on on the moon. Young people from around the United States, including young girls, were inspired by the first lunar landing.

The future of Project Apollo became uncertain, however, as Congress continued to cut NASA’s budget. After the accident aboard Apollo 13, when an oxygen tank onboard the ship exploded and the crew almost lost their lives, NASA became more cautious and some managers even called for the end of moon program. Apollo missions 18, 19 and 20 were cancelled, and many workers, especially at KSC, were laid off, making the hiring of more women difficult. Some women, like engineer Retha Hart, were hired during this period, most likely to fulfill a need for more female workers, although more experienced male employees were losing their jobs. While the women hired were definitely qualified, trying to reach affirmative action goals during a “bust” period is controversial and debated among historians. Because civil servants

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<sup>54</sup> “Figures and Figures,” *Spaceport News*, 3 January 1963, 6.

<sup>55</sup> “Co-op student Feels Part of KSC Team,” *Spaceport News*, 5 December 1968, 3.

jobs are relatively secure, there were few layoffs of NASA employees. Contractor males were not so fortunate, however, and many lost their jobs. During this period of cutbacks they would have accepted any job, even entry-level positions, into which less-experienced men and women were hired. Mary King states that the NASA employees who lost their jobs were in the GS-12 and higher occupations. At KSC there was a push to recruit new employees, both men and women, into entry-level positions that were exempt from layoffs. As such, both NASA and contractor employees who had many years of experience lost their jobs while less-experienced workers, some of whom were female, were hired at KSC.

Along with EEO laws and government regulations, Supreme Court cases also improved the situation for women workers. One case in particular addressed the issue of working mothers and whether or not employers could make hiring decisions based on a woman's parental status. In the case *Phillips v. Martin Marietta Corporation*<sup>56</sup> in 1971, Ida Phillips claimed that she had been discriminated against in the hiring process because of her sex. In 1966, Martin Marietta informed Phillips that it was not accepting job applications from women with pre-school-age children. Although lower courts sided with the company because it had hired women for the same position Phillips applied for, the Supreme Court ruled: "When performance characteristics of an individual are involved, even when parental roles are concerned, employment opportunity may be limited only by employment criteria that are neutral as to the sex of the applicant." By adding "sex" to Title VII of the 1964 Civil Rights Act, the Court added, Congress "intended to prevent employers from refusing 'to hire an individual based on stereotyped characterizations of

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<sup>56</sup> Martin Marietta Corporation was an aerospace firm that was later bought out and became part of Lockheed Martin corporation.

the sexes.” Because of this, it maintained that “characterizations of the proper domestic roles of the sexes were not to serve as predicates for restricting employment opportunity.”<sup>57</sup>

One indication of the changing workforce happened in 1971 when women were first allowed to wear pants suits to work. Previously, it was advised that women wear dresses, heels and pantyhose, although there was no written dress code. Women’s suits still had to be professional, and, according to Ruth Ann Strunk, the jacket had to be long enough to cover the rear. In 1971, *Spaceport News* featured a questionnaire, “If You Had 1 Choice: Wardrobe Of All Dresses or Pants Suits?” Two women answered pants suits, because they are more comfortable and offer more coverage, while the other two women answered dresses, because they are more feminine and that pants suits are not appropriate for work.<sup>58</sup> One could imagine that pants suits would be more appropriate for women in technical fields, as they often are required to visit facilities and perform duties that might be cumbersome in a dress.

Even though women were increasingly becoming involved in traditionally male-oriented technical occupations, people were still surprised to see women technical workers, and this was no exception at KSC. One of the most common findings among the oral histories was that KSC workers often mistook female technical workers, like engineer Ann Montgomery, for clerical workers. Since the overwhelming majority of women at KSC were in the clerical field, people assumed that every woman was a secretary. Montgomery was the only female in her department and the only woman who went out to work the launch pad. At first, the guards refused her entry inside the gate, as they had been previously reprimanded for letting in secretaries and assumed

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<sup>57</sup> FindLaw for Legal Professionals, “U.S. Supreme Court, *Phillips v. Martin Marietta Corporation*,” <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=400&invol=542>, (17 September 2004).

<sup>58</sup> “If You Had 1 Choice: Wardrobe Of All Dresses or Pants Suits?” *Spaceport News* (2 December 1971), 3.

she was also one. Montgomery was repeatedly mistaken for the office secretary after her desk was placed near the door during an office move.

People were very understanding and supportive of female technical workers, however. Montgomery's male co-workers became irate at this constant misunderstanding and saw the behavior as rude and intolerable. They made a sign for her desk which read, "Ann is not a secretary; please treat her as an engineer." Her co-workers' action is very telling of the workplace atmosphere. While the gesture was done out of frustration and to help a co-worker, one could argue that it was also done because the males did not want their occupation associated with the clerical field. Montgomery states that although these types of mix-ups occurred often, it was much easier once people got to know her and accepted her as an engineer.<sup>59</sup>

Ruth Ann Strunk was another female engineer during the Apollo program. In fact, when she left KSC in 1973, she and Montgomery were the only two female engineers in the Manned Spacecraft Operations office, which had over 4,000 employees. Strunk had hoped to major in engineering at Penn State, but at that time it was unusual for women she knew to go to college and even more unusual to major in engineering, so she majored in math. She graduated in 1967 and after NASA ended its hiring freeze, she joined NASA in the Acceptance Checkout Equipment (ACE) branch, which was responsible for the computer software and control rooms where engineers sat for check-out and launch. Strunk, well-accepted by her co-workers and contractor employees, was supported by NASA management. Still, she experienced some moments that were unique to female engineers. Once or twice during a launch test the test conductor asked her to deliver something to the control room, in order to wake up the sleepy employees. Another time, during a sign-off for the launch of Apollo 7 in 1968, the first flight

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<sup>59</sup> Ann Montgomery, phone interview by author, 20 April 2004.

after the Apollo 1 fire, male co-workers stuck a sign to her back that said “fully automatic,” which caused all the engineers and workers to chuckle. During that same check-out Strunk filled in for her male co-worker and was the only woman in the hallways waiting to sign off for launch. When she entered the room she was asked, “Did you bring a message?”, and surprised the managers when she told them she was there to sign off for the ACE computer systems.<sup>60</sup>

*Spaceport News* offered a profile of Strunk in 1972. The article, typical of others about female engineers, discussed her job as well as her outside interests, and emphasized her support for her husband, who also worked at KSC. The newsletter continued the trend of feminizing women engineers, stating that “thus, an attractive, quietly efficient woman holds a responsibility that, only a few years ago, would have been considered strictly a man’s position.”<sup>61</sup>

During Kennedy Space Center’s first decade, *Spaceport News* focused on two diverse issues regarding women. First, the newsletter portrayed women as “girls,” emphasized their feminine traits, and published pictures of smiling, pretty female employees. Meanwhile, it also underscored the increasing number of female technical workers. *Spaceport News* described the space program as using promotion by merit and disregarding sex and other factors when hiring new employees. Women could flourish and prove their worth in the technical fields in this type of egalitarian environment. Still, there were very few female technical workers, and still an emphasis on women employees being women first, workers second.

From 1962-1972, a variety of factors combined to create a situation where women could move into non-traditional occupations and advance in the workplace. Many female technical workers found themselves mistaken for clerical workers because the vast majority of women worked in that field, and so the stereotype developed that all women at KSC were secretaries.

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<sup>60</sup> Ruth Ann Strunk, interview by author, Kennedy Space Center, 13 May 2004, tape recording.

<sup>61</sup> “Woman Engineer Monitors ACE Operations,” *Spaceport News*, 18 May 1972, 5.

There were very few women who worked in technical occupations during the Apollo program. This began to change as a result of outside factors such as Equal Employment Opportunity laws, Supreme Court cases, and the women's movement. More women entered technical fields and they received "token" representations at KSC. Although women make inroads into traditionally male jobs, there was still a lack of women in management and female astronauts. During the next period, 1973-1979, women made remarkable advancements at KSC and NASA, including the addition of six women to the astronaut corps. However, assumptions about women workers and longstanding stereotypes would not easily change.

## CHAPTER 4: THE WOMEN'S MOVEMENT WORKS -- 1973-79

From 1962-72 women received token representation in technical fields as a result of new laws, Supreme Court rulings, and changing attitudes about women's roles. The following seven years, from 1973 until 1980, saw the beginnings of affirmative action and more focus on employment laws and increasing diversity in the workplace. At KSC, more women moved into technical fields and higher-level positions, and many clerical workers improved their skills through on-the-job training, special programs, or outside classes. KSC hired more technical workers as the new Space Shuttle program created a need for more employees, a demand which women could help fill. An important advancement in women's employment was NASA's selection of six women as astronauts in 1978. The most coveted and prestigious position -- astronaut -- was now open to women. Their selection, however, like the hiring of more female technical workers during the Apollo program, was based on necessity as well as a desire for equality, because shuttle flights would occur more often and have larger crews. Finally, despite numerous changes in women's roles, longstanding stereotypes and prejudices about working women persisted, and there were very few female managers.

According to Margaret Rossiter, 1972 marked a turning point in the struggles of working women. That year Title IX extended the Equal Pay Act of 1963 to higher education and banned sex discrimination in any program of an institution receiving federal funds.<sup>1</sup> As previously discussed, that year Congress gave the EEOC litigation enforcement authority, allowing the agency to initiate suits.<sup>2</sup> A year later, a Supreme Court ruling specified how plaintiffs could

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<sup>1</sup> Rossiter, *Before Affirmative Action*, 382.

<sup>2</sup> Equal Employment Opportunity Commission. "History," The Equal Employment Opportunity Commission Homepage. <http://www.eeoc.gov/abouteeoc/35th/history/index.html> (9 August 2004).

prove unlawful discrimination. In *McDonnell Douglas Corporation*<sup>3</sup> vs. *Green*, the Court outlined four qualifications for discrimination: 1) the plaintiff was a member of a Title VII protected group; (2) he or she applied and was qualified for the position sought; (3) the job was not offered to him or her; and (4) the employer continued to seek applicants with similar qualifications. If the plaintiff proved these four elements, the employer had to present a lawful reason why the individual was not hired. The employee could also prevail if he or she discredited the employer's alleged reason for not hiring him or her. As women were and are protected under Title VII, they now had a clear method of taking legal action if they were discriminated against.<sup>4</sup>

The year 1973 also marked a distinct turning point in the attitudes towards women workers as well as the amount of and types of work in which they engaged. During the years from 1973 to 1979, *Spaceport News* coverage shifted. It no longer carried articles about NASA wives or those that stressed the femininity of female technical workers. Instead, women's issues, such as EEO and the FWP, dominated its topics.

As a result of legal specifications and an increasing determination to meet new federal rules for EEO, KSC became increasingly committed to improving the recruitment of females and minorities, increasing female and minority representation in cooperative education programs, and, above all, hiring more female and minority technical workers. The EEO office continued working to insure that no NASA personnel suffered job discrimination because of race, color, religion, national origin, or sex. To do this, the agency used the Affirmative Action Plan, which called for "the utilization of minority and women employees and for increasing employment

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<sup>3</sup> McDonnell Douglas is an aerospace corporation.

<sup>4</sup> FindLaw for Legal Professionals, "McDonnell Douglas v. Green," FindLaw for Legal Professionals Supreme Court Cases, <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=411&invol=792> (22 September 2004).

opportunities for minorities and women at the Center.”<sup>5</sup> The NASA administrator during the late 1960s and 1970s, James Fletcher, also spoke out about equal opportunity efforts in NASA, which included teams of recruiters at field centers (including KSC) to identify top candidates for employment. They were also charged with identifying outstanding minority and female employees for special management training.<sup>6</sup>

During this period the number of female permanent employees in the overall NASA organization rose from 4,315 (16.6 percent of the total work force) to 4,438 (19.6 percent of the total work force), beginning a steady increase in the percentage of female workers. The number of females at KSC rose slightly from 420 (17.5 percent) to 442 (20.2 percent), typical of the overall NASA increase. Women continued serving in lower average GS grade levels than males within their occupational code groups. The majority of women still worked at a GS 1-6 pay level, with 2,950 women in that grade range in 1973 and 2,592 in 1979. The number of women at higher GS levels, however, steadily increased during this period. In 1973, 3,393 women (76.8 percent of the total amount of female employees) worked in the clerical field compared to 2,992 in 1979 (67.4 percent). The number of female scientists and engineers increased from 293 in 1973 to 463 in 1979, while the number of women in professional administrative field rose from 519 to 869.<sup>7</sup>

Within this data one sees a clear trend during the mid- to late-1970s -- a sluggish move away from clerical positions to higher-paying administrative or technical jobs. This occurred because of the increased hiring of female technical workers. In addition, the FWP Working

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<sup>5</sup> “Diggs Named KSC Equal Employment Opportunity Officer,” *Spaceport News*, 16 October 1973, 4.

<sup>6</sup> “Dr. Fletcher Cites Equal Opportunity Efforts in NASA,” *Spaceport News*, 21 November 1973, 8.

<sup>7</sup> Gawdiak and Fedor, 104. Judy A. Rumerman, *NASA Historical Data Book: Volume VI, 1979-1988* (Washington D.C.: NASA History Series, 1999), 465-66.

Group, a group of KSC employees dedicated to addressing women's issues, and other organizations enacted upward mobility programs, in which many workers attended training classes on center property or took college classes towards a higher degree at the agency's cost.

One such program was Specialty Training for Entry Professionals (STEP), which began in 1974. FEW and FWP manager Mary King were the major forces that pushed for the human resources office to establish the program, because about eighty percent of females were in the clerical field and there were initially no programs for their advancement. According to Vickie Hall, an Information Technology Customer Service Representative, women had a hard time moving out of that field until STEP and other programs were enacted.<sup>8</sup> It provided the opportunity to gain on-the-job training and experience, as well as formal training, designed to prepare participants for promotion in their selected line of work. Candidates entered the program by applying under an annual STEP job announcement. King would approach supervisors regarding open positions and ask if they would approve opening that job in a STEP capacity. Afterwards, a panel would review and rate the candidates, and top scorers would be eligible for reassignment in their present grades to undergo accelerated training for a target position in the next highest grade. Participants qualified for higher GS-levels once they completed each step of their training.<sup>9</sup> Pam Hales, a safety specialist in the Space Station directorate, was hired at KSC in 1975 as a clerk-steno in the safety office. To advance in her career, Hales took on the administrative duties of the engineers and ended up doing more of this than clerical work. She

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<sup>8</sup> Vickie Hall, interview by author, 17 March 2004, Kennedy Space Center, tape recording.

<sup>9</sup> "A STEP In The Right Direction," *Spaceport News*, 15 August 1980, 3-4.

later entered the STEP program in 1980 and eventually became involved in the safety field as a result of her involvement in the STEP program.<sup>10</sup>

Females also benefited from affirmative action programs by being hired during periods of declining employment or after being turned down originally, only to be immediately hired when KSC looked to employ more women. Retha Hart, the Deputy Director of Information Technology and Communications Services, believes that she was hired at KSC in 1975 during a period of downsizing because KSC was trying to hire more women and she was a qualified female with a master's degree in engineering.<sup>11</sup> Virginia Whitehead, the Launch Site Support Manager for Payloads, re-entered the aerospace field in 1979 after having four children and working as a teacher. When she first applied at KSC, she had been out of work in the field for ten years and was told that her experience was "too ancient."<sup>12</sup> When she called a second time, the same man wanted her right away because, she said, "I think they were trying to hire women." Unfortunately, during period of layoffs many experienced male employees lost their jobs while less experienced women *and* men were hired into entry-level positions.

In 1974 *Spaceport News* noted that hiring goals for women were met, as ten women were hired for scientific/engineering or professional administrative positions during the year. This statistic shows that although KSC worked to improve the representation of women in non-traditional fields, there were initially so few women in those occupations that hiring ten women over the course of a year was considered considerable advancement.<sup>13</sup>

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<sup>10</sup> Pam Hales, interview by author, 28 February 2004, Kennedy Space Center, FL, tape recording.

<sup>11</sup> Retha Hart, interview by author, 18 February 2004, Kennedy Space Center, FL, tape recording.

<sup>12</sup> Virginia Whitehead interview.

<sup>13</sup> "Equal Employment Program Active At Space Center During 1974," *Spaceport News*, 9 January 1975, 5.

The Federally Employed Women's group also worked to improve the status of women at KSC. Members hoped to "work with management to help end existing sex discrimination, and prepare its members for job opportunities through educational training programs, seminars and speakers."<sup>14</sup> Vickie Hall states that the organization was first known as a "rabble rouser group," but it helped start educational programs at KSC that women now take for granted.<sup>15</sup> A number of articles about FEW appeared in *Spaceport News*. It covered the group's activities, which ranged from offering training courses to giving awards and to the installation of new officers. The newsletter, interested in its activities, highlighted the importance of women's groups at the Center.

FEW and FWP played an important role in improving the status of women at KSC. First, they identified and addressed problems not only for women, but for all employees. By highlighting problems they showed that strides needed to be taken before equality could be achieved. As previously discussed in Chapter 1, scholar William Chafe notes that it is important to bring women into positions of power even before attitudes about gender roles changed. It is easier to change attitudes through exposure to new behavior than to change behavior as a result of new attitudes. Ann Montgomery agrees with Chafe's theory, saying that as more female technical workers were hired at KSC, there was a greater acceptance of women in non-traditional fields.<sup>16</sup> Women's groups assisted the upward mobility of female employees and, subsequently, helped change opinions about the appropriate place for females in the workforce.

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<sup>14</sup> "Federally Employed Women's Group Growing at Center," *Spaceport News*, 18 November 1971, 7.

<sup>15</sup> Vickie Hall interview.

<sup>16</sup> Ann Montgomery interview.

In 1972, the Space Shuttle program officially began. NASA wanted to build a reusable space vehicle that would theoretically cost much less than the costly Saturn V rockets and Apollo capsules that could only be used once. It also hoped to fly many more flights, perhaps even flying one shuttle once every two weeks. During the following nine years NASA developed the shuttle, which consisted of a reusable orbiter, reusable solid rocket boosters, and a liquid-filled external tank which would hold fuel for the orbiter's three main engines. As work on the program increased so did employment at KSC, including the percentage of female workers. As in the Apollo program, the need for more workers led to the hiring of more women, since NASA needed to utilize the total workforce. Consequently, the attitudes towards women in technical careers began changing dramatically during this period. In a 1974 newsletter poll entitled "Would You Encourage Your Children to Pursue A Space Related Technical Career?", Jerry Crute, a project engineer for NASA, answered "Yes, especially my daughter. The space program is offering more opportunities now for women in scientific related fields than anyone else."<sup>17</sup> Ideas about gender roles were changing in American society. A woman pursuing a technical career was no longer considered unusual; rather she was engaged in a smart career move.

Other articles showed how space-related fields were now good choices for women. For example, Audrey Rescigno, a draftsman for the Federal Electric Corporation, thought that "drafting is marvelous work for a woman...because women have more patience with detail."<sup>18</sup> Even though this idea was based on a stereotype about women's natural abilities, it still illustrates that many new career possibilities were now unfolding for women. Women made inroads to new careers by appealing to such stereotypes, which made their entry into these jobs

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<sup>17</sup> "KSC Camera: Would You Encourage Your Children to Pursue a Space Related Technical Career," *Spaceport News*, 22 August 1974, 7.

<sup>18</sup> "A. Rescigno's Job Takes Patience," *Spaceport News*, 30 May 1975, 8.

more acceptable because they could be seen as related to the “women’s sphere.” An article from 1978 focused on a father-daughter pair of safety engineers, Dave and Melonie Scofield, who worked for the Rockwell Corporation, a KSC contractor. Women could now follow their fathers’ footsteps into technical careers, but Melonie Scofield still found herself treated differently because of her sex. She stated that she had to deal with complaints, indifference or good-natured kidding from men who still saw her as somewhat of an oddity for working in a male-dominated profession.<sup>19</sup> For many female engineers, being treated differently was a fact of life at work.

The same 1978 article also stresses an important factor in the acceptance of women in technical fields. Like Mary King, Pat Lowry, who became FWP manager in 1977, also appealed to supervisors’ desires for their daughters to be successful and get good jobs regardless of their sex. She believes that KSC managers became more supportive of women as their daughters reached an age where they faced possible discrimination. She notes that many of the women who became engineers had fathers who were engineers or in another professional field.<sup>20</sup> Ann Montgomery also states that the people who seemed most understanding towards women in technical fields were those who had daughters.<sup>21</sup>

Retha Hart mentions another change regarding the attitude towards female employees. While KSC workers still found female engineers to be anomalies, the sex of workers became just one of a variety of factors that resulted in surprise. When Hart arrived at KSC in 1975, she says people reacted more to her youth than her sex. There was a range of responses such as “she’s so

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<sup>19</sup> “Father and Daughter Are Safety Engineers,” *Spaceport News*, 12 May 1978, 2.

<sup>20</sup> Pat Lowry, interview by author, 18 February 2004, Merritt Island, FL, tape recording.

<sup>21</sup> Ann Montgomery interview.

young” to expressions of surprise that as a female “she’s an engineer.”<sup>22</sup> Such attitudes continued through the 1980s and still persist today.

As KSC became more accepting of female workers in technical positions, it also grew more appreciative of the workers in the most common occupation for females -- secretaries. However, this appreciation sometimes caused problems for non-secretaries. Melodie Tucker, who was employed at Bendix, a sub-contractor at KSC, tells a story that took place on Secretaries Day in 1975. When she first started working in the space business in 1973, her company automatically sent flowers to all the female employees, since at the time all women were secretaries. Tucker was floored by this, since her first week on the job was during Secretaries Week and she was impressed by all the good treatment given to her. She thought she had “died and gone to heaven.” In 1975, Bendix hired its first two female engineers, and, as usual, the company automatically sent flowers to all its female employees. Needless to say, the two new female engineers were not pleased and Bendix stopped sending flowers to anybody during Secretaries Week.<sup>23</sup>

Despite examples of females rising through the ranks at KSC, there were still instances of disregard for Equal Employment Opportunity. In 1975, a Senate subcommittee called a hearing to discuss, among other things, NASA’s “self-admittedly poor record on equal employment.” One of their concerns was the dismissal of Ruth Bates Harris, the former Deputy Director for NASA’s Equal Opportunity office, after she and two aides filed a report that claimed the agency was not moving fast enough to hire minority and women workers. In the report she called the

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<sup>22</sup> Retha Hart interview.

<sup>23</sup> Melodie Tucker interview.

agency's equal employment program a "near-total failure."<sup>24</sup> At the Senate hearing, NASA defended this record as a result of the agency's shrinking work force and their inability to find an adequate number of qualified women and minority technical workers. After Harris' dismissal, Dr. Dudley G. McConnell, the head of NASA's Equal Opportunity programs, was quoted in the *Washington Post* as saying that Harris was not "dismissed because of the critical report but the time she spent preparing it should have been devoted to more positive kinds of things." When pressed by Senator William Proxmire, McConnell explained that "we need to focus on solutions and spend less time on rhetoric discussing the existence or lack of existence of problems. My idea is to remove problems through operational solutions." Apparently, to some at NASA, identifying problems was not an effective step in addressing concerns about equal opportunity.<sup>25</sup>

During the 1970s *Spaceport News*' language changed when discussing female technical workers. In 1974, Sue Weissenegger was named Deputy Chief Counsel for KSC. The newsletter stated that she joined KSC as a secretary in the Chief Counsel's staff in April 1963, even though Pat Lowry pointed out that Weissenegger already had a law degree. NASA Headquarters later made KSC promote her to a higher position because of her educational qualifications. The article, while not specifically addressing her sex, referred to her as "Mrs. Weissenegger."<sup>26</sup> Two years later, however, in an article entitled "Morgan Receives Sloan Fellowship," JoAnn Morgan was referred to by her last name, as was typical for references to

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<sup>24</sup> "NASA Defends Lag on Women's Jobs," *New York Times* (New York), 12 January 1974, 15.

<sup>25</sup> Congress, Senate, Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies, *Hearings Before a Subcommittee of the Committee on Appropriations*, 93<sup>rd</sup> Cong., 2<sup>nd</sup> sess., 11 January 1974, 135-136. "Dismissal Defended By NASA," *Washington Post, Times Herald*, 31 October 1973.

<sup>26</sup> "Weissenegger Named Deputy Chief Counsel," *Spaceport News*, 8 August 1974, 1.

male employees, and not as “Mrs. Morgan.”<sup>27</sup> The newsletter continued concerning itself more with the qualifications of and work done by KSC employees, instead of characterizing them in terms of their sex.

Although the employee data shows that the percentage of women working at NASA and specifically KSC increased during this period, the organization might well have done more to augment the number of women in technical fields or to give female employees the same equality as male employees. Women were still a minority in technical fields, especially engineering. Vickie Hall states that early on, women were mostly in the secretarial fields and that it was “a rare case that there were women engineers.”<sup>28</sup> Pat Lowry was told she would not get promoted above a certain grade because she did not have a degree. Later, when she discovered that male co-workers without degrees were in higher grades, she asked, “why are you applying different rules to women?” KSC fixed this problem and applied the same qualifications to all employees. Retha Hart, hired in 1975, was one of three engineers in her group and stated that women were still anomalies in her field when she started working at KSC. While in line for lunch all the male employees would face the lunch line so they could look at her and other female employees. She was the only female in her group who was not a secretary, and, during Secretaries Week, she received free drinks while out for lunch or dinner because it was assumed she was a secretary.<sup>29</sup> Shannon Bartell, currently head of the Orbital Space Plane project at KSC, joined the Air Force in 1976 and was the only woman in her tech class and one of two women on the base in her field.<sup>30</sup> Ann Montgomery reveals that NASA made little provision for the fact that persons

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<sup>27</sup> “Morgan Receives Sloan Fellowship,” *Spaceport News*, 13 May 1976, 8.

<sup>28</sup> Vickie Hall interview.

<sup>29</sup> Retha Hart interview.

<sup>30</sup> Shannon Bartell, interview by author, 2 February 2004, Kennedy Space Center, FL, tape recording.

occupying professional positions came in two sexes. As late as 1979 NASA still had no official policies on maternity leave for women engineers.<sup>31</sup>

While laws and Supreme Court rulings increasingly protected women in the workplace, some rulings failed to give women equality in certain areas. Sex, as a category of discrimination was not then or now subject to strict scrutiny, as is race, color, or national origin. In 1976 the Supreme Court ruled against women plaintiffs on the case of *General Electric Company v. Gilbert*. While the Court acknowledged that only women can become pregnant, it ruled that a health insurance plan for employees providing sickness and accident benefits for any disability but those arising as a result of pregnancy do not qualify as sex discrimination under Title VII of the Civil Rights Act of 1964.<sup>32</sup> These women could not receive benefits and suffered job losses because their health plan did not cover their pregnancy-related sicknesses and disabilities and there was no requirement that employers guarantee their jobs if they wanted to return after giving birth.

This problem was soon addressed when Congress passed the Pregnancy Discrimination Act of 1978. The Act amended Title VII to prohibit sex discrimination on the basis of pregnancy. This included medical conditions related to childbirth or pregnancy, and women who were affected by such were to be treated the same for all employment-related purposes, including the benefits they received under fringe benefit programs, except for certain instances concerning abortion.<sup>33</sup> This Act was an extremely important step in bringing women closer to true workplace equality, as it allowed women who were pregnant to receive equal employment

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<sup>31</sup> Ann Montgomery interview.

<sup>32</sup> *General Electric Co. v. Gilbert*, <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=429&invol=125>, Find Law for Legal Professionals, 22 September 2004.

<sup>33</sup> *Pregnancy Discrimination Act of 1978*, <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=429&invol=125>, Equal Employment Opportunity Commission History, 22 September 2004.

opportunity and the same health benefits as their male co-workers if they were to become disabled.

Although many secretaries were advancing their careers through the assistance of the Federal Women's Program and upward mobility programs, some had no desire to gain promotions. Jean Grenville, a secretary for 32 years, worked at Patrick Air Force Base<sup>34</sup> before moving to Kennedy Space Center. She enjoyed her work and felt like a cherished part of the employment team. Even so, she and other secretaries were sometimes given little credit for their work and were often passed over for projects and other positions when they opened. Grenville notes that no secretary ever received an award from 1977 to 1980.<sup>35</sup>

Despite some poor treatment, the *Spaceport News* coverage demonstrates why Grenville and others were satisfied with their clerical positions. During this period the newsletter continued its tradition of praising the work of secretaries and their support of the space program. In 1978 KSC honored its first Secretary of the Year, Joan Rodriguez. The newsletter article described Rodriguez's activities and portrayed her as a hard-working and dedicated professional. It also pointed out that Rodriguez had taken courses offered by NASA training and college classes.<sup>36</sup> This article demonstrated that secretaries were beginning to be seen as professionals who had some opportunity to advance into higher-paid positions when these opened and they had acquired the necessary skills. Secretarial jobs were no longer dead-end jobs that carried little opportunity for advancement beyond working for a boss who held a higher position at KSC.

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<sup>34</sup> Patrick Air Force Base is located south of Cocoa Beach in Brevard County, Florida.

<sup>35</sup> Jean Grenville interview.

<sup>36</sup> "First KSC Sec'y of Year Honored," *Spaceport News*, 28 April 1978, 1, 3.

The language used in the *Spaceport News*, however, indicated the perpetuation of some stereotypes about female workers and their place at KSC and the erosion of others. In a 1978 article, “Word Processing Aids Center Documentation,” the newsletter used feminine pronouns to describe word processing employees. For example, the article stated that “after *she* finishes typing, the operator gives the machine a command to transfer the material to a disk or diskette.”<sup>37</sup> Despite the presence of the stereotype that only women were involved in clerical work, the article also showed that secretaries were taking on more job responsibilities as well as improving old skills and adding new ones.<sup>38</sup> This article in particular demonstrated the dichotomy of attitudes towards female employees during this time. Women were praised and rewarded for improving their skills, but ideas surrounding sex-specific employment were still strongly held.

One important milestone for women in NASA was the selection of six female astronauts in 1978: Sally Ride, Judy Resnik, Kathy Sullivan, Anna Fisher, Rhea Seddon, and Shannon Lucid. With the new shuttle program, which could have up to seven astronauts on a mission, NASA needed more astronauts and could no longer afford to prohibit women from joining the Astronaut Corps. The new female astronauts were selected as mission specialists, which was the scientist-astronaut position. Women needed the same qualifications as men to be selected: at least a bachelor’s degree (many astronauts have advanced degrees), experience in their field of expertise, 20/20 correctable vision, normal blood pressure, and meet other physical requirements. Pilot astronauts still needed 1,000 hours of flight time in a jet aircraft, which women could not achieve as they were still unable to be test pilots. This was a significant step for women at NASA because they now occupied the agency’s most prestigious position. The workplace would

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<sup>37</sup> Italics mine.

<sup>38</sup> “Word Processing Aids Center Documentation,” *Spaceport News*, 27 October 1978, 4.

evolve with the times, not just out of the desire for equality, but also as a result of the need for a larger pool of potential employees, in this case the increasing demand for astronauts for the upcoming shuttle program.<sup>39</sup>

As the decade continued and more women moved into technical or higher positions there was some backlash towards women in non-traditional roles. Women continued to face outright discrimination from some fellow employees. Before becoming the FWP manager, Pat Lowry confronted obstacles from other departments and the human resources office even fought against the promotions some women applied for. Even though her involvement in FEW and the FWP was not limited to helping women exclusively, Lowry became a target for ridicule and was called a “bra-burner” or “women’s libber” by some males in other departments, whose names she did not mention. Because of this, she strongly considered whether or not she should accept the FWP manager position because she knew that in that capacity she would become a bigger target than before. Vickie Hall also received similar treatment and warnings from male co-workers when she joined FEW in 1978.<sup>40</sup>

Women who had interests in technical positions sometimes found themselves being told that their interests were misguided. Even earlier on their career path, while women were still in college, professors discouraged women from entering technical fields. In 1969, Retha Hart

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<sup>39</sup> The selection of female astronauts was a remarkable step for women in NASA. However, women were only selected as mission specialists due to the flight time requirements that women could not meet. There are three categories of shuttle astronauts: pilots, mission specialists, and payload specialists. Pilot astronauts come from the military and have at least 1000 hours of flying time in high-performance jet aircraft, and start in the pilot position, eventually moving into the highest-ranking position, commander. Mission specialists are scientist astronauts who perform experiments and spacewalks (many mission specialists have military backgrounds but choose to be mission specialists due to a variety of factors, including being able to perform spacewalks). Payload specialists are not employed by NASA, and are either special guests such as politicians or workers on a specific payload or satellite. Because women did not fly military jets, the first women astronauts were only eligible for mission specialist positions. Colonel Eileen Collins of the United States Air Force became the first female shuttle pilot in 1995, and the first female shuttle commander in 1999.

<sup>40</sup> Vickie Hall interview.

reveals, a counselor succeeded in discouraging her from going into engineering because she was a woman.<sup>41</sup> Ten years later these instances still occurred and still sometimes happen today. In 1979, while still in college, Maria Lopez-Tellado, Flight Systems Program Manager, and two other women in her class were asked by a professor, “what are you all doing here instead of learning how to laundry [sic] shirts?”<sup>42</sup>

The overall change in women’s employment during the 1970s was sometimes exaggerated, which led to further struggles for women. While the 1980 Census showed a small number of inroads into male professions during the 1970s, this increase was over-dramatized as an enduring victory for women. Because of these misleading reports, many people believed that affirmative action programs were no longer necessary, and advancement of women in technical fields stagnated. Jobs are still segregated by sex and although most professions are open to women, they are still internally segregated.<sup>43</sup>

Despite the continuing prevalence of such attitudes, from the mid- to late-1970s, NASA worked hard to help raise the status of women and made many strides. The beginnings of affirmative action brought more women into the overall workforce and at NASA, as the government forced NASA to report its employment records. Women began to advance out of clerical fields through on-the-job training, special programs, and outside classes. More women entered technical fields, sparked by the need for more workers brought on by the new space shuttle program, as well as the availability of more qualified females. Although there were increased job possibilities in all areas for women at KSC, not everyone accepted these new

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<sup>41</sup> Retha Hart interview.

<sup>42</sup> Maria Lopez-Tellado, phone interview by author, 20 May 2004.

<sup>43</sup> Barbara Reskin and Patricia Roos, et al, *Job Queues, Gender Queues: Explaining Women’s Inroads into Male Occupations* (Philadelphia: Temple University Press, 1990), ix, 3-4, 319-320.

changes, and stereotypes about female workers persisted. Even though women worked in all areas at KSC, total equality had not yet been reached, as evidenced by the lack of female managers and persisting ideas about gender roles. The 1980s, however, would bring further progress towards these goals, including more women managers.

## CHAPTER 5: WORKING WOMEN AS THE NORM -- 1980-89

In the 1980s the number of women in technical fields continued to increase as more women became interested in engineering and the sciences. More women entered fields like engineering that were once considered the domain of male employees and the percentage of female engineers increased at KSC. Female clerical workers moved into higher-paying administrative positions through either career advancement programs or by obtaining additional outside education. There was also an increase in the number of female managers as women in technical and non-technical fields moved into management positions. At KSC and in American society it was no longer unusual for women to work outside the home, even if they were married and had children. By the end of the 1980s, about two-thirds of married women held jobs, as did 68 percent of women with children.<sup>1</sup> Although it was more common to see women in technical fields, and males in clerical fields, attitudes and mindsets still had not changed much. Women in all occupations were continuously mistaken for clerical workers. At the same time, they also faced discrimination including lower wages than their male counterparts. Most important, a combination of apathy towards the women's movement, backlash against women's new roles, and persisting ideas about traditional female gender roles led to the decline of the women's movement and a stagnation of change.

The 1980s saw the beginning of a new era in space flight as the new fleet Space Shuttles began to fly. The orbiter *Columbia*, the first reusable space vehicle, made its first flight in 1981. Women were more involved in this space program than ever before, as engineers, managers, and even astronauts.

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<sup>1</sup> Nancy Woloch, *Women and the American Experience, Volume Two: From 1860* (New York: McGraw-Hill, Inc., 1994), 558.

An examination of NASA employee data reveals certain trends regarding female employees. Overall, as their numbers increased, fewer women worked in the clerical field, although they still comprised a majority of that occupation. Increasingly women found positions in technical, administrative, and professional fields, and more and more they entered higher GS-levels than in previous years. Still, it took their efforts and support from federal agencies under any administration that was less supportive of affirmative action to continue their progress.

The number of women in the permanent NASA workforce grew from 4,812 or 19.6 percent of total workforce in 1980 to 6,015 or 27.4 percent in 1988. This increase was for all occupational code groups, at all installations, and in all grades, although women continued to be concentrated in the lower GS grades. The number of female workers at Kennedy Space Center grew from 474 in 1980 to 618 in 1988, an increase from 21.5 percent of permanent employees to 27.6 percent. The steady rise in female employment, especially in technical, administrative and professional fields, can be attributed to the growing number of women receiving college degrees, especially in the scientific and engineering fields, ever increasing numbers of women working outside the home, continuing attempts to ensure these women equal opportunity, and the increasingly effective use at NASA of affirmative action as a management tool.<sup>2</sup>

In 1980, almost 64 percent of all female employees or 3,079 women worked in the clerical field. Eight years later, that number had declined to 2,719 females in 1988 or approximately 45 percent of all women. The overwhelming majority of employees in that field, however, or approximately 95 percent of the total occupational code group, were still female. In that same period, the number of female scientists and engineers rose steadily, from 578 in 1980 to 1,352 in 1988, an increase from approximately 10.4 percent to approximately 22.5 percent of the total female workforce. A similar increase occurred in the professional administrative field,

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<sup>2</sup> "Women in NASA's Work Force," *NASA Activities*, March/April 1983, 8.

in which women rose from 1,018 workers or 20.1 percent 1980 to 1,749 or 29.1 percent in 1988. Continuing the trend from earlier periods, the number of women concentrated in GS grades 1-6 declined from 2,689 in 1980 to 2,006 in 1988, while those in grades 7-12 increased from 1,840 to 3,074 in those eight years. Women in grades 13-15 rose from 248 in 1980 to 882 in 1988. Despite these increases, women continued to receive lower pay than their male counterparts within their occupational code groups.<sup>3</sup>

During the 1980s *Spaceport News* contained fewer profiles of individual employees and a greater focus on women's programs such as FEW and the FWP, as well as programs like EEO, which now worked to primarily ensure job security. The publication also gave more coverage to the cooperative education program (co-op) and the recruitment of females into KSC's workforce. The newsletter reflected larger societal changes by focusing on women's issues rather than female employees, demonstrating that society no longer perceived working women, even in technical fields, as anomalies. *Spaceport News* paid more attention to women's equality and highlighted prominent female employees and managers within KSC's workforce.

In 1980, the office of Affirmative Action Planning moved from the Civil Service Commission to the EEOC. According to Johnny Diggs, the KSC Equal Opportunity Program Officer Chief, "The ultimate goal in affirmative action planning is to eliminate under representation of minorities and women here and throughout the Federal work force."<sup>4</sup> Sexual harassment became a bigger issue during this time period. In 1980 the EEOC issued guidelines specifying that "sexual harassment," as there defined, is a form of sex discrimination prohibited by Title VII. The guidelines first describe the kinds of workplace conduct that may be actionable

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<sup>3</sup> Rumerman, 465-66.

<sup>4</sup> "1980 Is Transition Year for AAP," *Spaceport News*, 14 March 1980, 1.

under Title VII, such as discriminatory intimidation, ridicule, and insult.<sup>5</sup> NASA clarified its sexual harassment policy in 1980, which stressed that “both physical and verbal conduct fall within the scope of the guidelines,” and noted “sexual harassment need not be directly related to specific job opportunity or benefit but also includes the psychological atmosphere created.” It also added, “the agency has responsibility for the conduct of its supervisors and managers,” and warned that “harassment between peers is covered as well as harassment between supervisors and workers.” Finally, “all activity in the employment relationship is covered whether in the workplace or not.”<sup>6</sup>

In the late 1970s and early 1980s women were mostly concentrated in lower-level clerical positions and there were very few women managers.<sup>7</sup> The 1980s saw women move into more advanced positions by taking advantage of upward-mobility programs and by acquiring new skills. Melodie Tucker states that in this period the computer revolution enabled many women to improve their efficiency and expertise. Because women were proficient at typing and other clerical duties, an area that men considered “women’s work,” they easily adapted to working with the new computerized systems.<sup>8</sup>

During this period many women at KSC moved into higher level positions via upward mobility programs and outside training and more women were hired in technical fields. Shannon Bartell was hired at KSC in 1983 and initially some male co-workers treated her in a fatherly or gentlemanly manner, but Bartell believed that she should be treated equally and do the same

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<sup>5</sup> FindLaw for Legal Professionals, “Meritor Savings Bank vs. Vinson,” <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=477&invol=57> (25 September 2004).

<sup>6</sup> “Sexual Harassment Policy Stated,” *Spaceport News*, 20 June 1980, 2.

<sup>7</sup> Barbara Powell, interview by author, 27 January 2004, Kennedy Space Center, FL, tape recording.

<sup>8</sup> Melodie Tucker interview.

amount of work as her male counterparts. Because of her persistence her co-workers did not act differently towards her because of her gender.<sup>9</sup> At meetings for the Hubble Space Telescope in the late 1970s and early 1980s, Virginia Whitehead, who then worked as an engineer in the payload branch, was usually the only female present.<sup>10</sup> There were very few female engineers, and “you knew who they were because they stood out” in meetings and from female clerical workers, according to Barbara Lockley, a customer service representative in the Program Support and Process Engineering Office, who began her career at NASA as a clerk-steno.<sup>11</sup>

Continuing the trend from the previous period, many women found that it was not their sex that surprised people but rather their age. Many male employees at KSC, who had worked in the Apollo program, were surprised to see younger women in non-traditional fields. Lisa Malone, currently the Director of External Affairs and Business Development, was in her early 20s when she was hired full-time in the public affairs field, and her supervisors harbored some apprehension because of her age. Some did not believe she could make a good commentator because she had such a young-sounding voice. Instead, she became the first female launch commentator.<sup>12</sup> Susan Kroskey, who is Executive Director of the Cape Canaveral Spaceport Management Office, adds that because she reminded managers of their daughters they treated her very well because they wanted their daughters to receive the same type of support at school and work.<sup>13</sup>

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<sup>9</sup> Shannon Bartell interview.

<sup>10</sup> Virginia Whitehead interview.

<sup>11</sup> Barbara Lockley, interview by author, 13 May 2004, Kennedy Space Center, FL, tape recording.

<sup>12</sup> Lisa Malone, interview by author, 27 January 2004, Kennedy Space Center, FL, tape recording.

<sup>13</sup> Susan Kroskey, interview by author, 24 May 2004, Cape Canaveral Air Force Station, FL, tape recording.

Many female technical workers found their unique interests were a result of familial influence. Both Shannon Bartell and Maynette Smith were influenced by their fathers to pursue their career interests. Bartell gained an interest in electronics by working with her father on televisions and cars.<sup>14</sup> Maynette Smith, an engineer in strategic planning whose father was also an engineer, became interested in the field in high school. She began working at KSC in 1983 after receiving a Bachelor's of Engineering degree from Vanderbilt University.<sup>15</sup>

As seen through the employee data, many women engineers and scientists moved into higher positions during the 1980s. One important step towards equality in the workplace was NASA's inclusion of women into the astronaut corps. NASA accepted the first six female astronauts in 1978, and Sally Ride became the first American woman in space when she flew as a mission specialist in 1983. Her flight, designated STS- (Space Transportation System) 7, attracted wide attention in the media, and Ride proved her worth as America's first female astronaut. An article in *Spaceport News*, which contained a picture of astronaut Anna Fisher trying on a space suit designed for both male and female astronauts, discussed the new space suits for the Space Shuttle.<sup>16</sup> This article illustrated the changes within NASA as well as larger societal changes. Fifteen years after the Mercury 13 were denied additional astronaut testing and Valentina Tereshkova became the first woman in space, the idea that women were unfit to be astronauts dramatically changed to one of acceptance, as evidenced by positive newsletter articles and public reaction.

Also in the early 1980s, NASA began to consider sending civilians into space in order to better connect the American public with its space program. The organization decided that the

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<sup>14</sup> Shannon Bartell interview.

<sup>15</sup> Maynette Smith, interview by author, 24 March 2004, Kennedy Space Center, FL, tape recording.

<sup>16</sup> "Unisex Shuttle Suit Comes in Sm., Med. And Lg.," *Spaceport News*, 29 August 1980, 4.

best choice for the first civilian in space would be a teacher. In 1984, more than 12,000 teachers applied for NASA's "Teacher in Space" program. NASA finally selected Christa McAuliffe, a high school social studies teacher, to fly in space. Barbara Morgan, an elementary school teacher, was her back-up. Tragically, McAuliffe lost her life aboard the Space Shuttle *Challenger* in 1986, when it blew up less than a minute and a half after launch. The mission, designated STS 51-L, put space flights on hold for over two years while NASA redesigned the shuttle and made organizational changes. After the *Challenger* accident, Acting NASA administrator William Graham designated Barbara Morgan as the new Teacher in Space. In 1992, the program became the Teaching From Space program and developed a permanent presence for education within the Astronaut Corps. NASA now selects Educator Astronauts as well as pilots and mission specialists.

The two teaching programs helped NASA reach out to students and relay information about jobs in the space program. They also make an interesting statement about traditional women's occupations. There were very few women astronauts when the program began; however, both of the selectees for the Teacher in Space program were women. One can infer that this was because education is a traditionally female occupation, while women were still making inroads as mission specialist astronauts.

During this decade more women were promoted to managerial positions at KSC; their experiences, however, were both encouraging and discouraging. Much needed to be done to increase the number of women managers at KSC. Barbara Powell, the current president of Federally Employed Women, states that women moved into management areas and made considerable headway but were still not completely equal.<sup>17</sup> Shannon Bartell notes that most

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<sup>17</sup> Barbara Powell interview.

women at higher levels had been secretaries who worked their way up to management. She saw very few female engineer managers.<sup>18</sup> Irene Long, currently the Chief Medical Officer and Associate Director of Spaceport Services, was hired into a managerial position in the biomedical field in 1982. She observes that, as an African-American female manager, she “wasn’t exactly what [other managers] were used to.” Instead of dwelling on intolerance, she exerted herself and her strong work ethic left a favorable impression on her co-workers. She was usually the only minority female in technical meetings, but that number increased over time. Long notes that the biggest change she has seen at KSC is an increase in female managers.<sup>19</sup> Susan Kroskey remembers only one female manager to look up to as a mentor among the mostly male managers.<sup>20</sup>

The article “Sharon White Adopts Child” appeared in a 1983 issue and reflected changes in ideas about gender roles by showing that KSC respected women’s maternal duties and supported them both as parents and workers. Sharon White, a NASA/KSC contract negotiator in the Center Support Branch of the Procurement Office, adopted a three-year-old girl in 1983. White, a single parent, planned to put her daughter in day care while she worked during the day. (This would probably have been easier for White if KSC had an on-site child care center. A center did not open on-site until 1991.) The newsletter enthusiastically supported her decision to become a parent by explaining that more single people were adopting children, especially toddlers, since the Florida Department of Health and Rehabilitative Services had begun approving such adoptions.<sup>21</sup>

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<sup>18</sup> Shannon Bartell interview

<sup>19</sup> Irene Long, interview by author, 4 February 2004, Kennedy Space Center, FL, tape recording.

<sup>20</sup> Susan Kroskey interview.

<sup>21</sup> “Sharon White Adopts Child,” *Spaceport News*, 4 February 1983, 3.

*Spaceport News* sought to demonstrate that devotion to equal opportunity was not just words at KSC. The newsletter highlighted KSC's Equal Opportunity Counselors, "who are the backbone of the center's commitment to resolving issues informally." The nine EEO counselors, who were charged with the responsibility for providing pre-complaint counseling, were said to "provide an open channel through which employees or applicants may raise questions, discuss potential problems and get answers." While KSC wanted to avoid formal complaints about sex discrimination, it did encourage the use of EEO counselors to solve any problems in that area. The newsletter supported this procedure as a step towards achieving an egalitarian workplace.<sup>22</sup>

One of the most important developments at KSC was the recruitment of female workers through co-op and other student programs. Students, including minorities and women, could work at Kennedy Space Center over the summer and, hopefully, become interested in space-related careers. One of these, the Summer High School Apprenticeship Research Program (SHARP), was designed "to provide selected students with 'first-hand' experiences in research and development environments in order that each may explore tentative career choices." In 1981, four of the ten SHARP students were female.<sup>23</sup> Three years later the number of women had grown to seven of nine students. The majority of SHARP students continued to pursue science and engineering careers after they entered college.<sup>24</sup> Students needing money to continue their education could also work under the Summer Employment Program, and many of these students were also female.<sup>25</sup> In 1982, a Girl Scout group explored career potentials at KSC. The SUN-SPACE-SEA program lasted two weeks and combined career exploration and outdoor

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<sup>22</sup> "Equal Opportunity Not Just Words at KSC," *Spaceport News*, 8 June 1984, 5-6.

<sup>23</sup> "SHARP: Student Apprentices Experience Summer Research," *Spaceport News*, 9 October 1981, 6.

<sup>24</sup> "Students Work Summer at KSC," *Spaceport News*, 17 August 1984, 4.

<sup>25</sup> "Summer Students Gain Knowledge, Skills," *Spaceport News*, 3 August 1984, 2.

recreation for Girl Scouts ages 10 through 17. The career aspirations of the Scouts ranged from astronaut to secretary.

Other government programs worked to recruit qualified college graduates. Susan Kroskey began working at KSC in 1982 as part of the Presidential Management Internship Program, which aimed to attract fresh-outs, employees just out of college, on an accelerated management program. The program, run by the Office of Personnel Management, remains open to individuals who have a graduate degree and are interested in a career with federal service. After completing the program, which lasts two years, participants are eligible for conversion to a full-time civil service position and promotion to the GS-12 level. NASA is one of over 100 government agencies participating in this program. Kroskey saw also that many more women were entering the co-op program throughout the 1980s, including several in her program.<sup>26</sup>

After the space shuttle *Challenger* exploded during ascent in 1986, killing the seven astronauts on board, NASA went through a major reorganization and started hiring more recent college graduates and co-ops. More women were now graduating college with technical degrees since more females were entering those college programs.<sup>27</sup> Stephanie Stilson, NASA Vehicle Manager for the Discovery orbiter, was one of several women in her group when she began working at KSC as a co-op in 1988.<sup>28</sup>

Supreme Court rulings also continued to improve the situations of working women. One case in particular provided stricter guidelines for the workplace regarding hostile work environments, specifically sexual harassment. In the case of *Meritor Savings Bank vs. Vinson* in 1986, the Supreme Court recognized for the first time that sexual harassment is a violation of

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<sup>26</sup> Susan Kroskey interview.

<sup>27</sup> Lisa Malone interview.

<sup>28</sup> Stephanie Stilson, phone interview by author, 21 May 2004.

Title VII. Furthermore, it widened the area of sexual harassment to include validated claims of working under a "hostile environment." The court stated that the language of Title VII of the 1964 Civil Rights Act is not limited to "economic" or "tangible" discrimination. The phrase "terms, conditions, or privileges of employment" evinces a congressional intent "to strike at the entire spectrum of disparate treatment of men and women" in employment. In this judgment, the court concurred with the EEOC's description of sexual harassment. It could involve the creation of a workforce marked by intimidation, ridicule, and insult.<sup>29</sup>

Another Supreme Court case explained the requirements for a lawful voluntary affirmative action program. In *Johnson vs. Transportation Agency*, 1987, the court addressed the issue of whether or not affirmative action plans were in fact reverse discrimination. In 1978, the Santa Clara County Transit District Board of Supervisors adopted an Affirmative Action Plan for the County Transportation Agency, because, according to the county, the "mere prohibition of discriminatory practices is not enough to remedy the effects of past practices and to permit attainment of an equitable representation of minorities, women and handicapped persons." The Agency Plan provided that, in making promotions to positions within a traditionally segregated job classification in which women have been significantly underrepresented, the Agency is authorized to consider as one factor the sex of a qualified applicant.

In 1979, the Santa Clara, California Transportation Agency announced a job vacancy for the promotional position of road dispatcher. Both Paul Johnson and Diane Joyce applied, and were deemed qualified for the position. Johnson scored a 75 on a competitive interview, while Joyce scored a 73. The agency's director, James Graebner, decided that Joyce be promoted, and cited a combination of reasons, including affirmative action. Johnson filed a complaint to the

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<sup>29</sup> FindLaw for Legal Professionals, "Meritor Savings Bank vs. Vinson," <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=477&invol=57> (25 September 2004).

Equal Employment Opportunity Commission and later filed suit with the United States District Court. The Court of Appeals for the Ninth Circuit reversed the decision, and the case was then brought before the Supreme Court.

Before the court, the question for decision was whether or not the Agency impermissibly took into account the sex of the applicants in violation of Title VII of the 1964 Civil Rights Act. In its decision the Supreme Court ruled in favor of the Transportation Agency and affirmed that companies may voluntarily establish affirmative action plans to counter “manifest imbalances in the workforce as long as the rights of other workers are not unnecessarily trammled.” Under a valid plan, an employer must show a conspicuous under-representation of minorities or women in traditionally segregated job categories. According to the court, an affirmative action plan must not unnecessarily restrict the rights of male or non-minority employees or create an absolute barrier to their advancement. But it also stated that a moderate and flexible affirmative action plan would effect a gradual improvement in the representation of minorities and women in the workforce, and “such a plan is fully consistent with Title VII, for it embodies the contribution that voluntary employer action can make in eliminating the vestiges of discrimination in the workplace.”<sup>30</sup> In other words, this ruling affirmed that when women and minorities were severely underrepresented in positions in the workplace, that fact, along with competency, could be considered in hiring and promoting.

The impact of this case was far-reaching. The Supreme Court deemed it acceptable to consider sex as a factor in the hiring and promotions process, allowing companies to begin equalizing the diversity of the workforce in all occupations, especially male-dominated fields.

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<sup>30</sup> FindLaw for Legal Professionals, “Johnson v. Transportation Agency,” <http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=480&invol=616> (25 September 2004). Woloch, 560.

Engineering and other technical fields at Kennedy Space Center have consistently been dominated by men, and one of the Center's goals was, and still is, to increase the female workforce in such occupations. The Supreme Court's ruling supported such affirmative action plans and recognized that there had been a longstanding disparity in traditionally male occupations.

During this period there were numerous changes regarding working mothers at KSC. Rita Willcoxon, the Deputy Director for Spaceport Engineering and Technology, began working at KSC in 1988 in the industrial engineering field. Just before her interview she discovered she was pregnant. During the interview, she told the supervisor of her condition and explained that she would understand if he did not want to hire her because of the time off she would need. Instead, the supervisor replied "all I really need to know is are you gonna come back to work?" Willcoxon was very surprised to be hired and very impressed, because she knew that NASA was an organization that would support her and her family. To this day, she believes that NASA treats women extremely well and offers support for families. Her male co-workers also treat her with much respect.<sup>31</sup>

Retha Hart started working at KSC in 1975 and in 1989 gave birth to a daughter. While she was pregnant she worked in the firing room (the room in the Launch Control Center from where Saturn V rockets and Space Shuttles were launched) and there was no women's bathroom on her floor, apparently since no one had ever expected women to work there. This is a crucial issue in workforce discrimination that is often overlooked. Hart was the only female in her group when she was pregnant, and her male co-workers decided to band together and work the third shift for her (from 12 am to 8 am), so she would only have to work the first shift. The

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<sup>31</sup> Rita Willcoxon, interview by author, 4 March 2004, Kennedy Space Center, FL, tape recording.

workers' shifts would rotate. Since she was older and worried about her pregnancy, she was very grateful for their action.<sup>32</sup>

Laws also supported mothers and prospective mothers in the workplace. The Pregnancy Discrimination Act prohibited discrimination against prospective mothers, and a California law required unpaid leave of several months for pregnant women, and assurance that they would receive a similar job at the same level upon their return. In 1987 the Supreme Court upheld this law in *California Savings and Loan Association v. Guerra*. Across the nation, working mothers were granted more support, and subsequently women found it easier return to work after having children.

The pressure to conform to “male” norms of behavior is a problem faced by many women in technical fields. Christine Littleton discusses this phenomenon in her essay “Equality and Feminist Legal Theory.” There is no doubt that women and men are different; such differences have been used to explain sexual inequalities supported by social norms. Today, as the workplace strives for sexual equality, many women in traditionally “male” occupations find themselves struggling to conform to a workplace that tends to prefer male patterns of behavior. Littleton questions how it was decided that women are the “different sex.” By “assuming men are the norm,” she states, “women appear different, and indeed appear abnormal and inferior.” In creating a society in which men are the norm, women are forced to prove that they are really the “same” as men, when in fact they are not. This, in effect, guarantees that equality will continue to be the preserve of “men.” Littleton proposes a model of “equality of acceptance.” Women should not be forced to emulate male patterns of behavior in order to be accepted on the job. Instead, social institutions should adjust themselves to the fact that people come in two

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<sup>32</sup> Retha Hart interview.

sexes, not one, or one and a half. A society cannot elevate one social category (male) to the level of public norm, and subordinate the other (female).<sup>33</sup> Littleton's idea of equality of acceptance translates perfectly to the KSC arena. The workplace was built to accommodate male engineers, and when females finally entered areas such as the firing room and the Vehicle Assembly Building, they found the facilities lacking in women's restrooms and other necessities. Many women found it difficult to work in areas like the VAB while wearing the required skirts or dresses. There were no women's bathrooms on certain floors of the firing room, which made it difficult for women, especially pregnant women like Retha Hart, to work. It also took awhile for KSC to realize that employees will be pregnant and need to take time off work and establish a policy for maternity, much less parental, leave.

Even though the decade was a period of increased female employment, a continued move into technical areas, and a rise in the number of female managers, it was also a period of backlash against social changes. In 1991, Susan Faludi discussed a backlash against the women's movement and cited many ways in which feminist gains were undercut in the 1980s. This so-called backlash began in the late 1970s and included the "Stop ERA" and "right-to-life" movements. The feminist movement evoked strong feelings among women who felt that it represented an assault on traditional values. These women and the conservative right organized around the role of women. As such, the Ronald W. Reagan and George H.W. Bush administrations saw massive cuts in social programs, a verbal emphasis on family values without any legislation to support such values, and official hostility to feminist messages. Moreover, women's changing status in society incited new conflicts between political factions, between women and men, and women with competing interests. It also raised new questions about public

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<sup>33</sup> Christine Littleton, "Equality and Feminist Legal Theory," in *Women and Power in American History, A Reader: Volume II from 1870*, ed. Kathryn Kish Sklar and Thomas Dublin. (Englewood Cliffs, NJ: Prentice Hall, 1991), 276-289.

policy and its effectiveness in providing equal opportunity. People questioned whether the state should regulate the workplace and whether it could insure sexual equality.<sup>34</sup>

Another factor in this backlash was the decline of feminism as a widespread social movement. By the late 1980s, the reform mood and feminist ground swell of the late 1960s had vanished, as young, educated, and professional women took the women's movement for granted. They did not face the same obstacles and challenges as women who had led the second wave of the movement earlier.<sup>35</sup> Many young women resented the status of oppression feminism seemed to confer and voiced little interest in affiliating themselves with a 'militant crusade.' A 'feminist fatigue' overcame the new generation. Instead of a wide-sweeping social movement, the workplace seemed to be the new battleground for women. Their concerns during the 1980s surrounding the workplace included achieving vocational success, weighing career against motherhood, and coping with the dual stress of child rearing and employment. The search for equality was now centered on the workplace.<sup>36</sup>

There were other forms of backlash in the form of employee animosity. As Pat Lowry mentions, many male managers were skeptical of newly required training classes. Some saw these management classes as a waste of time and still held negative opinions about women working in technical fields.<sup>37</sup> Some male employees, who had worked in the space program for a long period of time, also resented female technical workers, especially those who were hired after a period when many upper-level male employees were laid off from their jobs. Not only

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<sup>34</sup> Nancy Woloch, 552, 553, 557.

<sup>35</sup> Susan Faludi, *Backlash: The Undeclared War Against American Women* (New York: Crown Publishing, 1991). The first wave of feminism culminated in the winning of women's suffrage in 1920.

<sup>36</sup> Woloch, 552, 557, 588.

<sup>37</sup> Pat Lowry interview.

did male employees take exception to some female workers, but their wives also felt threatened by the new female engineers and scientists. Shannon Bartell states that there were instances of affairs between co-workers and the divorce rate of KSC employees was very high as a result of long working hours.<sup>38</sup> One can infer that female homemakers whose husbands worked at KSC in technical fields might feel uneasy about their husbands working long hours with young female workers. Consequently, women faced animosity not only from employers, but also from fellow employees and their wives.

Despite its best efforts, NASA sometimes failed to provide equal opportunity for all workers. The agency, however, was quick to identify and address its problem areas. In 1987 its Equal Opportunity Council concluded that NASA had not attained its self-set goal for achieving equal employment opportunity due to the lack of manpower and the need to fill a number of positions quickly. As the newsletter noted, “NASA makes a special effort to hire and promote female and minority employees, but there are more available jobs than the market can fill.” To increase female and minority workers, NASA would begin recruiting in high school “because there are many more teenagers who show an interest in science and technology than actually go into it as a career.” In addition, the agency would seek to “improve its assistance programs for disadvantaged students and increase its cooperative programs for college students.”<sup>39</sup>

Prolonged stereotypes regarding female employees continued to affect women workers. More women at KSC had experiences where male co-workers mistook them as clerical workers. Shannon Bartell went to a review as a lead on a project and arrived early in order to get a seat at the conference table. As the room filled up and there were no longer any available seats at the

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<sup>38</sup> Shannon Bartell interview.

<sup>39</sup> “Employment drive targets students,” *Spaceport News*, 20 November 1987, 1- 6.

table, a man walked up to her and asked her if she would take minutes at the back of the room so he could sit there. She replied that she was not there to take minutes and she would not move.<sup>40</sup> Irene Long faced similar situations. Frequently at meetings co-workers would ask, “who are you representing?” She would reply, “Dr. Long,” and they would ask, “well when will he be here?” She would merely reply, “*She’s* here.”<sup>41</sup> Maria Lopez-Tellado was often the only woman or one of two women at a meeting and would sometimes be expected to take notes.<sup>42</sup> Women also still faced discrimination from their college professors. Diana Calero, an integration engineer in the Systems Engineering and Integration Branch, entered college in an engineering program in the late 1980s and was usually the only woman in her class. Since one of her professors greatly disliked female engineers, Calero had to prove herself to him. When she did, her good performance bothered him even more.<sup>43</sup>

Although working mothers became the norm during the 1980s, some NASA managers were not very supportive towards those women. A deputy director at NASA headquarters asked Maria Lopez-Tellado why she was not taking care of her baby at home. She replied that she wanted to set a good example for her child that women could work and still have a good family life. Her main challenge, as for many other working women, is balancing life between her husband, children, career and the home.<sup>44</sup>

Women made significant strides in their careers at KSC during the 1980s but still faced many barriers preventing full equality in the workplace. There were more women than ever

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<sup>40</sup> Shannon Bartell interview.

<sup>41</sup> Irene Long interview.

<sup>42</sup> Maria Lopez-Tellado interview.

<sup>43</sup> Diana Calero, interview by author, 25 May 2004, Cape Canaveral Air Force Station, FL, tape recording.

<sup>44</sup> Maria Lopez-Tellado interview.

before interested in technical fields like engineering. More women advanced their positions through upward mobility programs. The increase of female managers was a significant stride at KSC. However, ideas about women's roles were slow to change. Women were still mostly the primary caregivers at home and women technical workers often found themselves alone or among few females in their occupational groups. Public backlash and apathy stalled the women's movement and social change. Instead of allowing persisting barriers to weaken their continued advancement, women instead took on increased job responsibilities, participated in on the job training and upward mobility programs, and got degrees that allowed them to climb the career ladder. During the 1990s, ideas about women's employment would continue to change, leading to a dramatic increase in the number of women in technical fields and management positions at KSC.

## CHAPTER 6: EQUAL EMPLOYMENT OPPORTUNITY -- 1990-PRESENT

Since 1990 women's positions at KSC have increased slightly, but more importantly, societal ideas about women in the workplace have led to an increased number of female in the workplace. Many families support their daughters' decisions to enter technical fields like engineering, and see such fields as viable career options. KSC works hard to recruit qualified female workers and raise awareness about possible careers in technical occupations. Today, the majority of women at NASA work in the professional administrative field, jobs that are higher-paying positions than previously dominated clerical occupations. Women are now present in every occupation and skill level and have made significant strides in management positions. Despite a great deal of change since 1962, however, women have not yet achieved full workplace equality. Traditional assumptions about women's roles in the workplace have not yet disappeared. Engineering and other technical fields are still highly male-dominated. The number of women in technical fields will continue to slowly increase, but it seems as if the demand for change has eroded.

Previous trends in female employment have continued during the period since 1990, with some ups and downs. For NASA overall, the number of female permanent employees in fiscal year 1995 was 6,930 and 6,049 in 2004, a slight decrease. However, the number of total NASA employees decreased from 22,403 in fiscal year 1995 to 18,061 in fiscal year 2004, and the percentage of female employees increased somewhat from 31 percent to 33 percent. The proportion of female scientists and engineers rose slightly from approximately 16 percent of the occupational group in fiscal year 1995 to approximately 19 percent in fiscal year 2004. The number of professional administrative females also increased from approximately 54 percent of the occupational group in fiscal year 1995 to approximately 60 percent in fiscal year 2004. Also,

women were consistently the overwhelming majority of clerical workers, with their percentage hovering at 96 percent of that occupational code group. Women continued to be paid less than their male counterparts within occupational code groups and overall in NASA. The average male salary in fiscal year 2004 is \$62,790 with an average of 16.9 years of service, while the average female salary is \$53,500 and average 16.2 years of service. This discrepancy can be largely attributed to the overwhelming predominance of women in the clerical field, where the jobs are mostly low-paying.<sup>1</sup>

Kennedy Space Center has available information regarding the number of permanent female employees. That number is 578, compared to 1,212 male employees, and accounts for approximately 32 percent of the overall workforce.<sup>2</sup> The largest numbers of women are concentrated in the AA (Center Director) directorate, followed by XA (External Relations and Business Development) and CG (Chief Financial Office). The fewest number of women are concentrated in the PH (Space Shuttle) and YA (Spaceport Engineering and Technology) directorates, showing that the majority of women still work outside of technical fields.<sup>3</sup>

Despite advances made by women in technical fields, engineering continues to be the most male-dominated of all the professions. During the 1970s and 1980s the percentage of women receiving engineering degrees grew dramatically, and by 1989, women's shares of Bachelor's Degrees in engineering leveled off at 15 percent. Today, one of the biggest problems, if not the biggest problem, in scientific fields is the lack of sufficient science and engineering graduates to fill the ever-growing need. Employers have difficulty hiring a diverse workforce

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<sup>1</sup> National Aeronautics and Space Administration, "NASA People," <http://nasapeople.nasa.gov/workforce>, (25 September 2004).

<sup>2</sup> KSC Overview Sheet, All Grades/All Directorates, Form KRD, pay period end November 2002.

<sup>3</sup> KSC – Female Chart by Directorate, Data Source: KSC EDW – NASA PowerPlay, 7 August 2003.

when they cannot find enough potential employees. Still, more women today enter technical fields, and there is an increased willingness on the part of NASA to hire people with more diverse backgrounds. Thus, despite the lack of a sufficiently large employment pool, NASA has succeeded in hiring more women in technical fields during the past few years. The demand for engineers has grown dramatically, and there is an expected shortage of engineers for the next few decades.<sup>4</sup>

In *Women in Engineering*, Ruth Carter and Gill Kirkup analyze the status of women in this field. They conclude that women should be encouraged to become engineers, because the profession should have women to broaden its perspective. The work, moreover, is challenging and the women engineer reaps the professional rewards of high earnings and a materially comfortable lifestyle. Nonetheless, engineering is likely to remain an uncomfortable environment for women for some years to come. There is also a drawback in terms of stress, which maintaining both a professional identity and a private life engenders.<sup>5</sup>

During the period since 1990, women have made strides in career advancement, including technical fields. Stephanie Stilson started at KSC as a co-op student in 1988 and eventually hired on full-time in the payloads directorate. Her first branch chief supervisor was a woman, Cheryl McPhillips. Stilson sees more and more women winning higher positions and has always had women in her directorates, and believes that women encounter problems at work by not performing well, not as a result of their sex.<sup>6</sup> When Diana Calero began working at KSC as a co-op in 1991, there were several other female co-ops, and after she hired on full-time, she

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<sup>4</sup> Judith McIlwee and J. Gregg Robinson, *Women in Engineering: Gender, Power and Workplace Culture* (Albany: State University of New York Press, 1992).

<sup>5</sup> Ruth Carter and Gill Kirkup, *Women in Engineering: A Good Place To Be?* (London: Macmillan Education Ltd., 1990), 154.

<sup>6</sup> Stephanie Stilson interview.

was one of four women out of fifteen employees in her group. After a reorganization of departments, however, she was the only woman in her group. Currently, she is one of six female employees out of eighteen people, and her boss is a woman.<sup>7</sup>

One important success for Federally Employed Women and the Federal Women's Program is the advancement of family-oriented programs at KSC. As more families became two-income households, and as more mothers and potential mothers began working at KSC, many employees became frustrated with trying to find good child care close to center property. It was inconvenient for many parents to bring their children to outside daycare centers due to KSC's remote location, and if there were ever an emergency, it would be difficult to attend to their child's needs. Barbara Powell discussed the struggle to start a child care center on property. Powell first mentioned the need for a child care center to the center director in the mid-1980s, and explained that such an amenity would be a boost to employees' moral. After many years of struggle, in 1988 KSC finally decided to open a child care facility, in response to a survey that indicated significant interest. Pat Lowry stated that "a lot of parents who work here have problems locating good child care or want a facility where they can have closer contact with their children."<sup>8</sup> Construction for the child care facility began the following summer, with TutorTime International, Inc., a professional child care service, providing the design, construction and staff. The 7,200 square-foot building would accommodate 145 children, infants through preschoolers, and 25 staff workers. Jay Diggs, Director of the Equal Employment Opportunity Program Office, noted that "the need [for a child care center was] more evident than ever before."<sup>9</sup>

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<sup>7</sup> Diana Calero interview.

<sup>8</sup> "Day care on the way," *Spaceport News* (17 June 1988), 3.

<sup>9</sup> "Construction to begin on KSC child care facility," *Spaceport News* (16 June 1989), 1.

During a ground-breaking ceremony in 1989, Center Director Forrest S. McCartney stated that “meeting the future needs of our work team is important to us.”<sup>10</sup> The child care facility finally opened in early 1991, and helped alleviate the situations of both working mothers and fathers and allowed women a greater freedom in their employment opportunities.<sup>11</sup>

Even though the child care center was a victory for women’s groups and all employees, male and female, the fact that it did not open until 1991 indicates that KSC was somewhat behind the times in realizing the need for and offering this particular benefit. Daycare became a nationwide issue in the 1980s, when more mothers entered the workforce and needed care for their preschool-age children. Although KSC offered many amenities to its employees and often supported women’s family obligations, it took many years until management finally listened to employees’ suggestions about the need for a child care facility. One might assume that Kennedy Space Center, as a government organization, would be one of the first places to provide child care for its employees. Instead, it did not acknowledge employees’ requests to open a facility until much later. Powell speculates that the child care center was finally approved because management realized that young men would also benefit from such a facility.<sup>12</sup> The creation of a child care center shows that while KSC does work to help the situations of working women, it takes awhile for the organization to recognize their needs.

Also in 1991 the federal government enacted a new Civil Rights Act. This act overruled several Supreme Court cases of the 1980s which made it difficult for plaintiffs to prevail in their employment discrimination suits and to recover damages if they were successful. The Act

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<sup>10</sup> “KSC breaks ground for child care facility,” *Spaceport News* (22 September 1989), 8.

<sup>11</sup> “Day care center to open Jan. 2,” *Spaceport News* (14 December 1990), 1.

<sup>12</sup> Barbara Powell interview.

amended Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, and the Americans with Disabilities Act. Under this legislation, parties can request jury trials and successful plaintiffs can recover compensatory and punitive damages in intentional employment discrimination cases. It also expanded Title VII's protections to include Congressional and high level political appointees and eliminates the two and three year statute of limitations period for filing private lawsuits under the Age Discrimination in Employment Act, originally passed in 1967.<sup>13</sup>

Sexual harassment continued to be an issue for KSC managers. About 1993, KSC managers held a sexual harassment briefing which discussed new codes of conduct. The managers were advised on how to interact with employees of the opposite sex. After the briefing, Jean Grenville's boss told her that "I can't tell you that you look nice anymore," and that there could be no hugging or touching at the workplace.<sup>14</sup> KSC also looked to provide new and better solutions to sexual harassment. In 1993, Kennedy Space Center included Alternative Dispute Resolution, or mediation, in the informal discrimination complaints process. If ADR is elected by the complainant, an ADR Team is appointed to the case, consisting of a specially trained mediator who is a co-lateral employee of KSC, and a KSC senior manager who is also trained in mediation. The goal of the ADR process is to assist the parties in reaching a resolution to the issue(s). The complainant can cancel the mediation process at any time and does not give up the right to file a formal complaint. However, if a resolution is reached during ADR the complainant then agrees not to file a formal complaint.<sup>15</sup>

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<sup>13</sup> Equal Employment Opportunity Commission, "Civil Rights Act of 1991," Equal Employment Opportunity History, [http://www.eeoc.gov/abouteeoc/35th/thelaw/cra\\_1991.html](http://www.eeoc.gov/abouteeoc/35th/thelaw/cra_1991.html) (16 September 2004).

<sup>14</sup> Jean Grenville interview.

<sup>15</sup> KSC Equal Employment Opportunity Homepage, "Discrimination," <http://www.ksc.nasa.gov/nasa-only/eo/discrimination.html> (1 July 2003), 1-2.

KSC has a longstanding policy of zero tolerance for sexual harassment, which includes harassment by employee coworkers, managers, supervisors, or contractor personnel at the workplace or at any KSC-sponsored activity. Harassment includes unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature. Such activities are considered harassment when the conduct is made implicitly or explicitly a condition of employment, rejection of conduct is used as a basis for employment decisions, or the conduct interferes with work performance or creates an intimidating, hostile, or offensive work environment. Complaints should be made to the chief of the Equal Employment Opportunity office or any appropriate management official. James Kennedy, Center Director, is “deeply committed to ensuring a fair and hospitable workplace that is free of harassment,” and declares that “sexual harassment, like other types of discriminatory behavior, is prohibited and will not be tolerated” at KSC.<sup>16</sup>

Outside organizations also provided solutions to the problem of recruiting females to the workplace. In 1993, the Ms. Foundation organized “Take Our Daughters to Work Day,” which sought to “give girls a realistic view of day-to-day work”<sup>17</sup> and “make young women more aware of the many career choices available to them.”<sup>18</sup> Throughout the 1990s KSC offered “Take Our Daughters to Work” Days and “Take Our Sons to Work” Days, and in 2000, the Center offered a “Take Our Children to Work Day” which combined the previous “Daughters” and “Sons” work days.<sup>19</sup> Today the Ms. Foundation organizes “Take Our Daughters and Sons to Work Day,” aimed to broaden the conversation about work-family issues and encourage “family friendly”

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<sup>16</sup> James Kennedy, “Memorandum to all KSC Civil Service and Contractor Employees,” 25 May 2004.

<sup>17</sup> “Taking Daughters to Work,” *Spaceport News*, 24 May 1996, 8.

<sup>18</sup> “Daughters Day set for April 24,” *Spaceport News*, 22 April 1997, 1.

<sup>19</sup> “Take Our Children to Work Day set for July 28,” *Spaceport News*, 14 July 2000, 8.

workplaces for working mothers and fathers.<sup>20</sup> The existence of such programs indicates a growing commitment to sex equality in the workplace.

Under the Family Medical Leave Act of 1993 (FMLA), covered employers must grant eligible employees up to a total of 12 workweeks of unpaid leave during any twelve month period for certain family obligations. These include the birth or care of a newborn child of the employee, the placement with the employee of a child for adoption or foster care, to take care of an immediate family member with a serious health condition, or to take medical leave when the employee is unable to work because of a serious health condition. The FMLA is very important in insuring the jobs of potential mothers and fathers, and therefore has greatly improved the situation of women at KSC.<sup>21</sup>

KSC continued to commit itself to advancing EEO and identifying and fixing problems within the agency. In 1994 Yvonne Freeman, NASA's Associate Administrator for Equal Opportunity, stated that "significant strides are being made in making NASA's work force more reflective of the American population." She also stated that KSC fared well compared to other centers in increasing its diversity, but needed to increase minority participation in its co-op programs.<sup>22</sup> Former NASA administrator Daniel Goldin commented on the number of NASA female employees during an address for 1994 Women's History Month. In some areas, "the numbers [were] getting better," and "thirty-three percent of the thirty-nine people who report[ed] directly to [Goldin were] women and minorities." However, "in other areas the numbers [were]

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<sup>20</sup> Take Our Daughters and Sons to Work, "Take Our Daughters and Sons to Work Day Press Room," <http://www.daughtersandsonstowork.org/wmspage.cfm?parm1=332> (26 September 2004).

<sup>21</sup> U.S. Department of Labor: Compliance Assistance: Family and Medical Leave Act, "Family and Medical Leave Act," U.S. Department of Labor, <http://www.dol.gov/esa/whd/fmla/>, (16 September 2004).

<sup>22</sup> "EO Chief Sees More Diversity In NASA Work Force," *Spaceport News*, 25 March 1994, 1.

frustratingly low,” which had to be fixed, because “women make up 51 percent of the population and they should hold a much larger percentage of the jobs at every level of this agency.”<sup>23</sup>

The increase in female employees at KSC, especially the number of female technical workers, can be attributed partially to a sometimes fluctuating government commitment since the 1960s to providing equal opportunity to all employees. As one of his first official acts, President George W. Bush issued a memorandum to the heads of all executive departments and agencies regarding the standards of official conduct. It stated, “employees shall adhere to all laws and regulations that provide equal opportunity for all Americans regardless of race, color, religion, sex, national origin, age, or handicap.”<sup>24</sup> On February 28, 2003, NASA Administrator Sean O’Keefe submitted a memorandum to all NASA employees urging them to read President Bush’s memorandum and to comply with the ethical principles which “embody core values of trust, impartiality, and equal treatment.”<sup>25</sup>

Female astronauts made more advances during the 1990s. Eileen Collins became the first female shuttle pilot in 1995 and the first female shuttle commander in 1999. She is currently assigned to be commander for STS-114, the first mission after the *Columbia* accident.<sup>26</sup> The fact that a woman would be assigned commander of such an important mission shows the progress made in women’s rights since the early 1960s. Then, NASA managers would not consider female astronauts because of the risky nature of the first space flights, and they were worried

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<sup>23</sup> Daniel Goldin, “National Women’s History Month Opening Remarks,” NASA Headquarters, 18 March 1994.

<sup>24</sup> President George W. Bush, “Memorandum to heads of all executive departments and agencies ,” 20 January 2001.

<sup>25</sup> Sean O’Keefe, “Memorandum to all NASA employees,” 28 February 2003.

<sup>26</sup> The orbiter *Columbia* disintegrated upon reentry on February 1, 2003.

about public reaction should an accident happen.<sup>27</sup> They also were not certain that women would make viable astronauts. Today, NASA managers feel confident in trusting a female with the command of a widely watched and anticipated mission.

Today, women are employed in all areas of KSC and have even moved into upper management fields. As the lack of articles about female workers in *Spaceport News* demonstrates, they are no longer considered a rarity or unique at KSC. Lisa Malone states that “every consideration is given to women” for jobs at KSC.<sup>28</sup> Young female engineers such as Cassie Blum, Stacie Smith, and Joylene Hall concur and point out that being a woman is hardly ever an issue at work. Blum, a Propulsion Engineer for Launch Services, agrees with fellow women who began working at KSC in the 1980s, who point to their age rather than gender as usually being a point of discussion. She says that most people are surprised by her occupation because she does not come across as being scholarly or serious. At work, people are interested in her ideas because of her age rather than her sex, and young males in her group are also treated with the same curiosity.<sup>29</sup> Hall, Logistics Operations Engineer, states that people at KSC are more eager to assist her as a new employee and encourage her to help with groups such as the Black Employment Strategy Team.<sup>30</sup> Smith, a Technical Resource Analyst in the Space Station directorate, whose family is very supportive of her career choices, notes that people are always

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<sup>27</sup> As of 2004, four women have died during space flights: Judy Resnik and Christa McAuliffe were killed when the *Challenger* exploded in 1986. Kaplana Chawla and Laurel Clark died when the *Columbia* broke apart upon re-entry in 2003. Upon their deaths, the public reaction was no different than its response to the deaths of their fellow male crewmembers and other male astronauts.

<sup>28</sup> Lisa Malone interview.

<sup>29</sup> Cassie Blum, interview by author, 5 March 2004, Cocoa Beach, FL, tape recording.

<sup>30</sup> Joylene Hall, interview by author, 16 April 2004, Kennedy Space Center, FL, tape recording.

impressed after learning she works for NASA and that her gender is rarely an issue at work.<sup>31</sup>

Their attitudes demonstrate that today women are less concerned with sex equality in the workplace, mostly because it has been less of an issue than for women during previous decades.

One reason for the growth of female employees, especially in more technical fields, was the increased recruitment by KSC of female and minority students by utilizing the pipeline for technical workers. The pipeline is the path young people take towards their careers, through an introduction to technical fields, entering educational programs, and beginning careers. For females, this pipeline is leaky, and they tend to leave the fields before reaching their career destinations. This is because many women are discouraged from pursuing their technical interests early in their educational career.<sup>32</sup>

By recruiting younger students, KSC can influence young girls to continue their interest in technical fields. Different recruitment methods have increased the number of female technical workers. Lisa Malone praises the NASA education office as being an important factor in interesting young girls in technical fields. “Our NASA Education office has been I think key in trying to engage young girls into the science and engineering fields at a much younger age.” These types of programs really help form opinions about career paths, according to Malone.<sup>33</sup> Another method of recruitment is through the co-op program, which has contributed a large number of female and minority workers in non-traditional fields. Susan Kroskey states that one could see changes in the number of young women entering the workforce who already have their degrees, due to their involvement in the co-op program. Other KSC groups work to influence a

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<sup>31</sup> Stacie Smith, interview by author, 11 May 2004, Kennedy Space Center, FL, tape recording.

<sup>32</sup> Henry Etzkowitz, Carol Kemelgor and Brian Uzzi, *Athena Unbound: The Advancement of Women in Science and Technology* (Cambridge: Cambridge University Press, 2000).

<sup>33</sup> Lisa Malone interview.

new generation of workers. Joylene Hall, who is a mentor as well as a recruiter for groups such as the National Society of Black Engineers, says that school groups are very happy to see a woman engineer because it offers encouragement to young girls as well as shows young boys that women are involved in different types of work.<sup>34</sup>

Because of increased recruitment, more women are entering the workplace with college degrees in technical fields. Shannon Bartell points out that more women are coming into the engineering field at entry levels as more women graduate with engineering degrees.<sup>35</sup> This contrasts to earlier years at KSC when the majority of women advanced from clerical positions by taking part in Equal Opportunity programs such as STEP or by getting a higher degree. Management is also very influential in achieving EEO goals. Stacie Smith praises Center Director James Kennedy for recruiting for diversity and stated that he was very “proactive” and scouted for women.<sup>36</sup>

NASA is committed to helping employees increase their education. The NASA website offers information about life-long learning. It states that “as a NASA employee, our expectation is that you will continue to learn and develop throughout your career. Life-long learning is not only important...it is absolutely necessary for our continuing success.” NASA offers “subsidized continuing education, extensive onsite training, continuing exposure to the latest technology, and a constant influx of new and challenging projects” to “help you continue to learn throughout

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<sup>34</sup> Joylene Hall interview.

<sup>35</sup> Shannon Bartell interview

<sup>36</sup> Stacie Smith interview.

your NASA career.” As such, “NASA will prepay your tuition for college coursework related to your job.”<sup>37</sup>

KSC also helps its employees better their skills through two separate academic programs. The Kennedy Undergraduate Studies Program (KUSP) allows full-time permanent NASA civil service employees with at least one continuous year of employment to pursue academic programs leading to an AST- (Aeronautical Space Technology) qualifying degree, which is a rating for engineers. The program is designed to provide an internal source of qualified candidates in shortage category occupations that require an academic degree, and which will continue to be in demand. The KUSP provides funding for tuition at a Florida state college and textbooks, and allows participants up to four hours of duty time off per week if their classes are only available during working hours.<sup>38</sup>

Another program assists workers pursuing graduate degrees. The Kennedy Graduate Fellowship Program allows eligible, permanent full-time civil service employees with at least one continuous year of employment to attend academic training for up to 52 weeks in full- and part-time doctoral programs and full-time master’s programs. Employees can complete programs that will help them develop expertise that can help accomplish the Center’s strategic objectives. The primary focus of this program is science and engineering disciplines, as well as a master’s degree in information technology. Workers can attend classes on a full-time basis for up to one academic year and still receive salary if they meet qualifications. These two programs

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<sup>37</sup> NASA Jobs, “A Quick Look at NASA Employee Benefits,” NASA Office of Human Resources, [http://www.nasajobs.nasa.gov/benefits/quick\\_look\\_at\\_NASA\\_cs\\_benefits.htm](http://www.nasajobs.nasa.gov/benefits/quick_look_at_NASA_cs_benefits.htm) (9 November 2004).

<sup>38</sup> Human Resources Office, Training and Development, “Kennedy Undergraduate Studies program,” John F. Kennedy Space Center – Workforce and Diversity Management Office, <http://ba.ksc.nasa.gov/kusp.htm> (18 September 2004).

show that KSC is committed to improving workers' skills, an important contribution to the advancement of female employees.<sup>39</sup>

Many women mentioned the increasingly unlimited opportunities for women at KSC. Shannon Bartell comments that despite some leftover pockets of the "good-old-boy attitude," "the atmosphere today is unlimited to me for a woman working at NASA," and that friends in other government agencies are jealous of how NASA treats women.<sup>40</sup> Lisa Malone states that "I think that right now we're doing all we can do" and that "every consideration is given to women" for jobs.<sup>41</sup> Rita Willcoxon agrees, noting that "NASA's a very supportive organization. From my perspective it treats women extremely well." NASA offers the opportunity to balance work and family, but it is the employee who has to work that out.<sup>42</sup>

These ideas are supported by NASA policies. According to NASA's website, the organization has instituted a variety of programs and policies designed to insure that employees can continue to meet the needs and demands of family and personal life while continuing to successfully perform their NASA duties. These "Family Friendly" initiatives include: flexible work and leave schedules; leave sharing, flexi-place programs; safety, wellness, and recreation programs; Employee Assistance Programs; educational outreach; career and benefits counseling,

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<sup>39</sup> Human Resources Office, Training and Development, "Kennedy Graduate Fellowship Program," John F. Kennedy Space Center – Workforce and Diversity Management Office, <http://ba.ksc.nasa.gov/kgfp.htm> (18 September 2004).

<sup>40</sup> Shannon Bartell interview.

<sup>41</sup> Lisa Malone interview.

<sup>42</sup> Rita Willcoxon interview.

and relocation assistance. Many NASA installations, including KSC, also offer onsite or nearby childcare facilities.<sup>43</sup>

As noted by Irene Long, one of the biggest changes at KSC is the increased number of female managers.<sup>44</sup> The newsletter interviewed JoAnn Morgan, KSC's first female senior executive, in 1992, while she was director of Payload Projects Management. At the time she was still one of the only senior women managers at KSC. Morgan stated that she was still frequently the only woman at meetings, but that fact was changing as time went on. "The role of women at KSC and throughout NASA is becoming increasingly more visible, and for the better," she now believes.<sup>45</sup> Diana Calero has noticed a large increase in the number of women engineers in the past five to ten years, especially in the last five.<sup>46</sup>

The move into management positions by women has not always been an easy transition. Barbara Lockley sees "women moving into management," as "just slow," and notes "some foot dragging on a lot of the men's part." It has also taken a long time for conference tables to become integrated, even for women.<sup>47</sup> Even when women became managers, some have a hard time "looking back" and supporting female employees, according to Ann Gary, an Information Technology Customer Service Representative. She states that women need to establish networks amongst themselves as well as with managers in order to improve their status at KSC.<sup>48</sup>

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<sup>43</sup> NASA Jobs, "A Quick Look at NASA Employee Benefits," NASA Office of Human Resources, [http://www.nasajobs.nasa.gov/benefits/quick\\_look\\_at\\_NASA\\_cs\\_benefits.htm](http://www.nasajobs.nasa.gov/benefits/quick_look_at_NASA_cs_benefits.htm) (9 November 2004).

<sup>44</sup> Irene Long interview.

<sup>45</sup> "Women's accomplishments recognized during March," *Spaceport News*, 13 March 1992, 6.

<sup>46</sup> Diana Calero interview.

<sup>47</sup> Barbara Lockley interview.

<sup>48</sup> Ann Gary, interview by author, 1 May 2004, Titusville, FL, tape recording.

Women managers are important not only because they show a company's diversity, but they also present different viewpoints that men may not perceive. Shannon Bartell explains, "I look at things different than a manager at my level who's a guy looks at it. I just see it differently."<sup>49</sup> Shannon Roberts, Associate Director for External Relations and Business Development, agrees and adds that "KSC would benefit from having more exposure to other ways of thinking other than the engineering perspective."<sup>50</sup> Diana Calero states that women can see things or attack a problem differently, and that women tend to be more open to ideas rather than dictating answers.<sup>51</sup> Retha Hart believes that women make good supervisors because they tend to care and look out for their employees.<sup>52</sup>

The biggest changes at KSC over the past forty years can be explained by those who were there from the beginning, including Ann Montgomery, Ruth Ann Strunk and Virginia Whitehead. Montgomery, who was a senior executive in logistics and the first female vehicle flow manager, retired from KSC in 2002 after thirty-four years of service. During her time she noticed large increases in the number of female employees, especially in the technical areas, and a move by women into management fields. After she became a manager, people who had once told her that they would never work for a woman asked her for jobs.<sup>53</sup> Ruth Ann Strunk worked with Montgomery during the Apollo program but left NASA in 1973 to pursue family obligations. She returned to the engineering field in 1986 with a job at Pan-Am (she later moved to Johnson Controls when they acquired the contract) at Cape Canaveral Air Force Station, and

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<sup>49</sup> Shannon Bartell interview.

<sup>50</sup> Shannon Roberts, interview by author, 6 July 2004, Kennedy Space Center, FL, tape recording.

<sup>51</sup> Diana Calero interview.

<sup>52</sup> Retha Hart interview.

<sup>53</sup> Ann Montgomery phone interview.

returned to KSC in 1998 working for Space Gateway Support. Strunk notes that there was a huge improvement in the number of women employees when she returned to KSC as opposed to her days in the Apollo program, at both NASA and contractor organizations.<sup>54</sup> Whitehead was usually the only female in her department, but this began to change after she was hired at KSC in the 1970s. Today, women are in every field and there are more women managers. She describes KSC as “a different place” than before.<sup>55</sup>

Since 1990 women made significant advancements at KSC. KSC works hard to recruit females into technical fields, and to raise awareness that these fields exist and are open to women. Families support their daughters who choose technical fields. Female scientists are no longer “unusual.” At KSC, the majority of women now work in the professional and administrative field. Women continue to make remarkable contributions while paving the way for others. As more women obtain degrees in technical and professional fields, and more members of the internal management team become open to the idea of diverse employment teams, the number of women employed in technical fields at NASA, and KSC specifically, increase. JoAnn Morgan succinctly tells the story of women at the Center, stating that “The role of women at KSC and throughout NASA is becoming increasingly more visible, and for the better.”<sup>56</sup> Women’s status and opportunities were increasing on sometimes a daily basis, but there was still always room for more diversity and prospects for female employees. The role of women in NASA will continue to grow as all employees participate in NASA’s mission. NASA

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<sup>54</sup> Ruth Ann Strunk interview.

<sup>55</sup> Virginia Whitehead interview.

<sup>56</sup> “Morgan: The role of women...is becoming increasingly more visible,” *Spaceport News*, 13 March 1992, 6.

is not a perfect organization, however, and there are still areas, such as senior management, that lack true workplace equality.

## CHAPTER 7: EPILOGUE -- ROOM FOR IMPROVEMENT

In spite of the remarkable advancements for women at KSC, especially for women in technical fields, female employees have still not achieved equality. NASA managers realize that room for improvement exists. KSC still has very few senior level female managers. There are still glass ceilings and barriers to non-engineers in place that prevent some women from achieving career advancement. Although the number of female technical works has risen dramatically, women are still underrepresented in engineering and other technical fields, and this is no exception at KSC. This is due in some part to young girls' lack of interest in technical fields. Finally, there are still some longstanding negative attitudes about female technical workers held by men who have worked at KSC since the Apollo era. While the government can enact laws and the Supreme Court can rule on cases pertaining the equal employment opportunity, such factors cannot change the opinions of the most obstinate employees.

In the past ten years the percentage of women at NASA increased from 31 percent of all employees to 33 percent, and the number of women in technical fields grew from 16 percent of those professions to 19 percent, despite a decrease in NASA's overall employment. The general consensus among interviewees is that KSC has greatly improved its treatment of women and has worked hard to increase the Center's diversity. True equality is hard to reach, however, and even if more could be done to increase the numbers and status of females at KSC, it would not change the attitudes of the most stubborn employees.

Although the rate of women entering technical professions has improved significantly, the numbers reaching high-level positions are much smaller than expected. During the 1960s, women consisted of less than 1 percent of engineering PhDs. In the 1980s that rose to 6 percent and 11 percent in the 1990s. The University of Central Florida (UCF) began as a technical

university, and is still a leader in technical fields. One of its colleges is the College of Engineering and Computer Science (CECS). According to its website, CECS is a leading college for women in engineering and computer science. During the 2003-04 academic year, 121 females, or about 18 percent of total graduates, and 564 males received bachelor's degrees from CECS. It awarded 42 master's degrees to females, or about 20 percent, and 7 doctoral degrees, or a total of about 16 percent, in academic year 2003-04. The number of doctoral degrees awarded to women peaked in 1996-97 at about 45 percent, and has declined and risen erratically since, with women receiving about 39 percent of doctoral degrees in 1997-98, 31 percent in 1998-99, only 7 percent in 1999-2000, 17 percent in 2000-01, 13 percent in 2001-02, and 11 percent in 2002-03. For Fall 2004, 888 females were enrolled as undergraduate students in CECS (19.5 percent). 147 females were enrolled as masters students (22.9 percent), and 110 females were enrolled as PhD students (21.8 percent). UCF ranks in the top 8 percent nationally for engineering bachelor's degrees awarded to women, and twenty-two percent of CECS graduate students are women. The College also excels in the number of female faculty members. One-third of CECS department chairs are women, the number of female faculty exceeds the national average, and UCF has a director for women in engineering and computer science.<sup>1</sup> Today, there is a strong commitment to increasing the number of women in engineering and other technical fields.

The Society of Women Engineers (SWE) is a not-for-profit educational and service organization dedicated to establishing women as a highly desirable career choice for women. Founded in 1950, its objectives are to inform young women, their parents, counselors, and the

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<sup>1</sup> CECS Web Portal, "UCF College of Engineering and Computer Science Fast Facts 2004," UCF College of Engineering and Computer Science, [http://www.engr.ucf.edu/Main.aspx?Page\\_ID=87](http://www.engr.ucf.edu/Main.aspx?Page_ID=87) (9 November 2004). UCF Office of Instructional Research, "Degrees Conferred," Degrees Awarded by UCF by Academic Year, <http://www.iroffice.ucf.edu/degrees/degreesconferred.html> (9 November 2004).

general public, of the qualifications and achievements of women engineers and the opportunities open to them, to assist women in readying themselves for a return to active work after temporary retirement, to serve as a center of information on women in engineering, and to encourage women engineers to attain high levels of education and professional achievement. SWE researches the number of women in engineering occupations and the number of women receiving engineering degrees. Its research shows that there has been a significant increase in the number of female engineers since the 1960s, but it also demonstrates that women are still underrepresented in technical fields like engineering. In 1999, about 10.6 percent of all engineers were female, compared to 5.8 percent in 1983. The percentage of women receiving bachelor's degrees in engineering rose from .4 percent in 1966 to 2.1 percent in 1975. By 1985 that number had risen to 14.5 percent, an increase of over 14 percent. In 1995 the percentage of females receiving bachelor's degrees was 17.3 percent, and as of 2000, 20.5 percent of bachelor's degrees were awarded to women. In 1975, only 2.5 percent of engineering master's degrees and 1.7 percent of engineering doctoral degrees were awarded to women, compared to 20.7 percent and 16.3 percent in the year 2000, respectively.<sup>2</sup>

Although women make up a larger percent of scientific fields, despite recent progress, women continue to be chronically underrepresented in scientific careers, and their participation declines as one moves higher up the career ladder, mainly because of family obligations or problems in the workplace.<sup>3</sup> There is a lack of interest in engineering and other technical fields by males and females. In order to fill the current need for engineering positions and compete with the rest of the world, the United States needs to always make use of its potential workforce.

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<sup>2</sup> Society of Women Engineers Home Page, "National Home," Society of Women Engineers, [http://www.swe.org/stellent/idcplg?IdcService=SS\\_GET\\_PAGE&nodeId=5](http://www.swe.org/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=5) (10 November 2004).

<sup>3</sup> Henry Etzkowitz, Carol Kemelgor and Brian Uzzi, *Athena Unbound: The Advancement of Women in Science and Technology* (Cambridge: Cambridge University Press, 2000).

There is no longer a need for more manpower or even womanpower, but more humanpower. More men as well as women are needed in the sciences, especially engineering, but women continue to be extremely underrepresented in the field of engineering.

Shannon Roberts echoes this sentiment, saying that KSC's statistics are not necessarily a point of pride. She believes that the Center does a much better job at diversification but not as good as possible. A constant challenge for KSC is the lack of openness of the internal management team to diversification. One cause of this is "mirror management," or the idea that managers feel most comfortable hiring and supervising similar people. Even with an ample number of potential female employees, managers may not be quick to hire them if they are averse to working with different kinds of people.<sup>4</sup>

Even though the majority of married women and mothers work outside the home, longstanding ideas about housework and childrearing persist. On September 14, 2004, the Bureau of Labor Statistics of the United States Department of Labor released the results of the American Time-Use Survey for 2003. What many had long believed is now confirmed: women typically spend less time at the workplace and more time on household chores and raising children. Although the difference between men's and women's time-use has decreased over time, its continued existence shows that ideas about traditional gender roles for women persist today. On the days they worked, employed men worked about an hour more than employed women. This difference partly reflects women's greater likelihood of working part time. However, even among full-time workers (those usually working 35 hours or more per week), men worked slightly longer than women--8.3 versus 7.7 hours. On an average day in 2003, 84 percent of women and 63 percent of men spent some time doing household activities, such as housework, cooking, lawn care, or financial and other household management. Twenty percent

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<sup>4</sup> Shannon Roberts interview.

of men reported doing housework--such as cleaning or doing laundry--compared with 55 percent of women. About 35 percent of men did food preparation or cleanup versus 66 percent of women. Adult women in households with children under age 18 spent about 1.7 hours providing childcare as their primary activity. Adult men in such households spent 0.8 hour (about 50 minutes). Adult women in households with children under age 13 spent on average about 6.4 hours providing secondary childcare. That is, they had at least one child under age 13 in their care while doing other things, such as housework or shopping. Adult men in such households spent about 4.1 hours providing this type of care.<sup>5</sup> The women of NASA today, in all likelihood, mirror these national trends. This means that their domestic and child care duties consume more of their time and strength than they do for men. It is more difficult for them to enter the “fast track” towards career advancement when they do not have as much time to dedicate to their work. Even though husbands now perform more domestic work, the greater attention women pay to household obligations cannot help but hinder their advancement on the job.

Although every woman interviewed in this study of women at NASA’s Kennedy Space Center was very grateful for the opportunity to work for such a prestigious employer, some asserted that there are still barriers in place that females of all occupations continue to face. According to Barbara Powell, women constantly look at a glass ceiling and still do not receive fair pay. Women have moved up into managerial positions, but are “still not equal but making headway.” She also feels “that every government agency should be doing more” to increase diversity, a sentiment that most women interviewed seconded, and that “we haven’t made things equal yet.”<sup>6</sup> Delores Abraham, a Public Affairs Specialist in the Guest Services and Special

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<sup>5</sup> Bureau of Labor Statistics, “American Time-Use Survey Summary,” Bureau of Labor Statistics News, <http://www.bls.gov/news.release/atus.nr0.htm> (16 September 2004).

<sup>6</sup> Barbara Powell interview.

Events Director, states that even today women who have degrees are not at the same grade levels as their male co-workers.<sup>7</sup> Even though women have entered management, there is still a long way to go and goals to achieve, for example Center Director or Director of Shuttle Processing, according to Stephanie Stilson.<sup>8</sup>

Specific barriers at KSC include technical qualifications for upper level positions. Vickie Hall recognizes this stumbling block for non-engineers at KSC, because they eventually reach a glass ceiling, that they cannot break through unless they have an engineering degree. Since the majority of women at KSC have non-engineering degrees, they are less likely to be promoted to the highest GS-levels.<sup>9</sup> Shannon Roberts points out that “KSC would benefit from having more exposure to the other ways of thinking other than the engineering perspective.”<sup>10</sup> Because women are mostly employed in the professional and administrative fields, this could increase the number of women employed at KSC. Ann Gary agrees that it is hard to get one of the highest level jobs if one does not have an AST (aeronautical space technology) rating, and, therefore, jobs are very limited. She also claims that promotions are still hard for women and they have to fight for promotions. Gary herself had to fight for a promotion during the Center’s last reorganization during KSC 2000. Two suggestions she makes for improving the status of women is to increase networking and for women to be visible in places that will help them advance.<sup>11</sup>

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<sup>7</sup> Delores Abraham, interview by author, 4 May 2004, Kennedy Space Center, FL, tape recording.

<sup>8</sup> Stephanie Stilson interview.

<sup>9</sup> Vickie Hall interview.

<sup>10</sup> Shannon Roberts interview.

<sup>11</sup> Ann Gary interview.

Some historians and analysts, such as Cynthia Costello and Anne J. Stone, still see a glass ceiling at work that makes it difficult for women to reach upper management positions because employees assume that men are better suited for such positions. Costello and Stone believe that women leaders are extremely beneficial as they inspire girls and young women to enter fields they might not otherwise consider. Also, placing women in these positions is a way to help boys become accustomed to both male and female leaders and become comfortable with working with and for women.<sup>12</sup>

It is still hard to inform all parts of the populations about job opportunities at NASA, especially those from backgrounds that do not normally enter technical fields, even though NASA and KSC recruit voraciously for female and minority employees in all occupations. Irene Long states that NASA and KSC programs have created equal access to technical jobs within the agency, but she would like to see more people taking advantage of that access.<sup>13</sup>

It is also hard to improve the numbers of women at KSC when there is a lack of qualified engineers. Maynette Smith states that “in all areas we’re just not getting the people, whether it be men or women, into the science and engineering fields that we had been.”<sup>14</sup> By 1996, women represented 46 percent of the U.S. labor force but only 22 percent of those holding positions in math, science and engineering. As already noted, at a young age, many girls are interested in science, but this interest tends to erode early in the high school ages. This is because parents tend to hold different educational and career expectations for sons and daughters, which in turn influences the expectations of the children. Also, research shows that women who succeed in

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<sup>12</sup> Cynthia Costello and Anne Stone, *The American Woman 2001-2002: Getting to the Top* (New York: W.W. Norton and Company, 2001).

<sup>13</sup> Irene Long interview.

<sup>14</sup> Maynette Smith interview.

science education and occupations tend to have family backgrounds that encourage individualism or technical interests. When young women are interested in the sciences, they are less likely to remain in those types of occupations than young men because of structural barriers and hiring processes. Also, the educational background of women in science does not necessarily lead to occupational advances.<sup>15</sup>

One obviously cannot fault KSC for not hiring enough females if there are not enough women or men graduating with engineering degrees. Cassie Blum states that one way to fix this problem would be to have a representative body of women in the Speaker's Bureau, so that people will not view female engineers as oddities and become used to the idea that women can be engineers. If women engineers become more visible, they will be more accepted as a normal occurrence, by both men and women.<sup>16</sup>

Despite KSC's great strides at opening every occupation to women, it is still difficult, even impossible, to change opinions of those who do not wish to diversify the workplace. Pat Lowry saw this when she first began training managers. She believes that managers felt forced to undergo training and did not always want to be there, and they would occasionally express their discomfort. She would tell them, "We understand that some of you are going to discriminate, you just can't do it at work." Those managers would act rudely, Lowry claims, because they were afraid of change.<sup>17</sup> Melodie Tucker adds that "you can mandate it and you can write it down in a law but that does not change the way people think. And it does not change how they were raised and it does not change...their personal mores."<sup>18</sup> Maria Lopez-Tellado

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<sup>15</sup> Sandra Hanson, *Lost Talent: Women in the Sciences* (Philadelphia: Temple University Press, 1996).

<sup>16</sup> Cassie Blum interview.

<sup>17</sup> Pat Lowry interview.

<sup>18</sup> Melodie Tucker interview.

states KSC still has managers who were once the engineers with the mentality that women could only be secretaries, and they have not yet changed their minds. Until the new generation of men reaches the top levels of management, the culture will not change much.<sup>19</sup> Stephanie Stilson agrees, stating that such attitudes are disappearing within younger males.<sup>20</sup>

Even after advances in EEO, some women have faced questions regarding the reasons for their hiring. Joylene Hall had that experience in college when a professor told her that “you’ll get into NASA but only because of quotas.”<sup>21</sup> Stacie Smith points out that “there is always room for improvement – not that we’re trying to push men out” of their jobs or replace them because of quotas.<sup>22</sup> While some employees looked bitterly upon women employees who succeed and attribute their success only to being a part of affirmative action, the data does not support their beliefs, as too many women have spread into all areas over the past twenty years “for that to be true, but you still find that perception at times.”<sup>23</sup>

Some women find it difficult to work with contractors because of their attitudes towards female workers. While this is not an issue on which KSC itself has a direct impact, it points out existing negative opinions regarding women in non-traditional occupations. Maynette Smith describes one problem she had with a payload contractor who questioned her abilities. After the person figured out she could do the job, however, her sex was no longer an issue.<sup>24</sup> Stephanie Stilson had a similar experience while working in shuttle processing. Her contractor counterpart

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<sup>19</sup> Maria Lopez-Tellado interview.

<sup>20</sup> Stephanie Stilson phone interview.

<sup>21</sup> Joylene Hall interview.

<sup>22</sup> Stacie Smith interview.

<sup>23</sup> Shannon Bartell interview.

<sup>24</sup> Maynette Smith interview.

was not very receptive of her; he was older and did not offer her the respect she deserved as a co-worker because of her sex and youthful age. Diana Calero maintains, “I can’t say that I see them [contractors] treating me differently, although I can recall a few times where being introduced as their point of contact for whatever it was I was doing, you could kind of maybe see a little skepticism in their face.” However, once contractors saw that she was a competent worker, they acted in a professional manner and her sex was no longer a problem.<sup>25</sup>

Additionally, there are still those who criticize women for speaking up and taking charge. Melodie Tucker believes that she was “considered to be a bitch” if she stood up for her ideas while in meetings. While this attitude disappears as time goes on, its remainder demonstrate that women still have barriers to break at KSC and the workforce at large. Although women have made significant advances in the workplace, including a move into management positions, assumptions about women’s roles in the workplace will continue to impede workplace equality for women.

One major issue of concern is the current administration’s waning support of affirmative action. Management Directive 715 has changed the way employers consider women and minority employees. Instead of considering the make-up of their staffs when making hires and promotions, as called for in prior directives, managers at federal agencies are being asked to evaluate potential barriers that prevent the advancement of women and minorities.<sup>26</sup> Old attitudes have a long shelf-life and endure even when circumstances change. Hopefully, women have found a consciousness that change can take place and will fight to continue their gains for themselves and their children.

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<sup>25</sup> Diana Calero interview.

<sup>26</sup> Darryl Fears, “New Guidelines De-emphasize Diversity in Government Work Force,” *Orlando Sentinel*, 10 October 2004, A-9.

Despite numerous advances, there are still many improvements that can be made at NASA and KSC. For example, there is still a lack of senior level female managers. Women continue to be underrepresented in technical fields like engineering, due in part to young girls' lagging interest in scientific fields as they age. Some women who lack engineering degrees encounter glass ceilings and employment barriers that prevent their career advancement. Finally, KSC cannot change the "minds and hearts" of workers who refuse to change their opinions about female technical workers. The Center can only force a change in behavior through EEO laws and hiring more female technical workers. As Ann Montgomery states, the more women there are at KSC, the greater the acceptance. Hopefully, this change in behavior, as it did during World War II, will lead to permanent change and acceptance.

## CHAPTER 8: CONCLUSION

Over the past forty-two years, the number of women employed at KSC gradually increased. There are more women at KSC today, especially in technical fields and management positions. The largest percentage of women in NASA works in the professional administrative field. In 1969, 5,541 women worked for NASA compared to 6,049 women in 2004. While this is not a substantial increase, one can see a more pronounced difference in the percentage of female technical employees. Today, women make up 19 percent of engineers and scientists compared to 7.4 percent in 1969. Another change has been the move out of clerical positions into higher-paid professional administrative jobs -- women consisted of 14.7 of the field in 1970 compared to 60 percent in 2004.<sup>1</sup> Women's roles and positions changed in accordance with the women's movement and other outside factors. As William Chafe states, change is quicker to come through a behavior modifications rather than by waiting for opinions to change on their own. While women appreciate increased acceptance and laws which increase female employment, they want to prove their worth as workers and be hired for their qualifications, not to fill a quota.

This thesis answers several questions about women's employment. At first, women at KSC occupied mostly clerical positions. Today, the majority of women work in the professional administrative field, although a larger percentage women work in engineering and scientific fields and management positions. It is obvious that women today enjoy greater professional opportunities at Kennedy Space Center than when it opened in 1962. Women are involved in all areas and levels of employment, including management. During the 1970s women gained more job opportunities than ever before, and NASA worked hard to increase the number of female

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<sup>1</sup> Gawdiak and Fedor, 104. National Aeronautics and Space Administration, "Nasa Workforce," <http://nasapeople.nasa.gov/workforce>, 3 October 2004.

employees. This continues to the present day with programs such as the Summer High School Apprenticeship Research Program and “Take Our Daughters and Sons to Work Day.” Women also joined the management force in record numbers -- JoAnn Morgan became the first female senior level executive in the 1990s, and Dr. Irene Long is the Chief Medical Officer at KSC.

Changes at KSC correlated with outside factors. One can argue that these outside factors forced changes in women’s employment. Laws such as such as the Equal Pay Act of 1963 and the Civil Rights Act of 1964, the formation of the Equal Employment Opportunity Commission, Supreme Court cases that affected working women, and the women’s movement in America worked together to force token representation for female workers. Another reason for the improvement of women’s roles is the new generation of employees. As a new generation of men arrives at positions of influence, and they are more likely to accept women into positions of power as they have most likely come into contact with women in their educational careers.<sup>2</sup>

As a government organization, NASA does much to improve its diversity at each center, including KSC. Its official position is very supportive of all female workers. The Equal Employment Opportunity office, Federally Employed Women, and the Federal Women’s Program Working Group all helped increase the status of women at KSC and made the center a friendlier environment for women. One important improvement was the child care center, which opened in 1991. The Federal Women’s Program manager has worked to improve the situation for women by training managers on diversity.

KSC’s official employee newsletter, *Spaceport News*, at first seemed fascinated by the prospect of female engineers and focused on how their sex affected their work and work environment. The newsletter followed women’s groups such as Federally Employed Women and the Federal Women’s Program as well as equal opportunity development throughout the

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<sup>2</sup> Sylvia D. Fries, “The History of Women in NASA,” 28 March 1988, page 7-8.

years. The language of the newsletter regarding women has clearly changed from the early years of the Center. At first, *Spaceport News* referred to women as gals and were often pictured in attractive poses and sometimes even scantily clad. Later, it began using the word “women” and eventually called women by their last names instead of “Mrs.” The newsletter’s evolution reflects the changes taking place within NASA and American society.

Despite many positive changes at KSC, women still face hardships. Some employees believe that more can be done to increase diversity, the best option being to engage in educational outreach to help increase the number of women in technical fields. Currently, there are still few female executives, but their number has greatly increased in recent years. Kennedy Space Center holds more prospects for women now than ever before, but years of discrimination continue to keep women out of the highest and most prosperous positions. Persistent ideas about women’s roles prevent full workforce equality. According to Vickie Hall and other KSC employees, it is still common for women to be mistaken for secretaries as a result of their gender.<sup>3</sup> It seems that despite all the advances made by women over the years, there are still social expectations that have not changed.

Evidence from oral histories suggests some interesting trends regarding female employment at KSC. Several women, including Retha Hart, Lisa Malone and Maynette Smith, remark that male co-workers were more surprised about their young age than their sex.<sup>4</sup> Although some co-workers were taken aback by young females in the workplace, it did not prevent women from advancing in their careers.

Women who enter non-traditional fields receive much support from their families. Female engineers like Stacie Smith and Cassie Blum were encouraged by their families to pursue

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<sup>3</sup> Vickie Hall interview.

<sup>4</sup> Retha Hart interview, Lisa Malone interview, Maynette Smith interview.

their career aspirations.<sup>5</sup> While they may have taken non-traditional paths in life, these women did not face discouragement in their personal lives. Other women found inspiration for their career choices at home. Several women commented that they gained a love of technical areas as a result of paternal influences. Maynette Smith's father was an engineer and taught her about the field, and led to her choice to enter the engineering field.<sup>6</sup> Shannon Bartell learned about electronics by working with her father.<sup>7</sup>

There seems to be a discrepancy between clerical and technical workers regarding their career advancement. Several women interviewed participated in upward mobility programs that enabled them to move out of the clerical field into professional administrative occupations. They remarked that this was the typical way for clerical workers to advance. Currently more women are hired into professional administrative fields, but quite a few women in that field started out in clerical jobs. On the other hand, women in technical occupations were usually hired in those positions and advanced within their field. As more women graduated college with engineering degrees, the number of female engineers at KSC increased. Also affecting the number of women in engineering and other technical occupations was NASA's co-op program. Several interviewees, such as Diana Calero and Stephanie Stilson, participated in the co-op program at KSC and other NASA centers, leading to full-time employment upon graduations. Recruitment has been a large factor in the increase of female technical workers.

All of the women interviewed for this thesis agree that women at KSC are in a much better place professionally than they were forty years ago. They enjoy their careers and believe that KSC is one of the best places to work. They also express appreciation for the support

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<sup>5</sup> Cassie Blum interview, Stacie Smith interview.

<sup>6</sup> Maynette Smith interview.

<sup>7</sup> Shannon Bartell interview.

NASA gives its employees. Several women comment that NASA allows women to balance family and work. Retha Hart and Rita Willcoxon state that NASA was extremely supportive of them during their pregnancies.<sup>8</sup>

The overwhelming sentiment of female employees is the desire to never be promoted on the basis of their sex. Every woman stated that they want to gain promotions because of their merit, not to fill certain diversity quotas. Retha Hart remarks that she was confident that she received promotions because of her abilities.<sup>9</sup> Stacie Smith never wants a female to get a position just because of her sex.<sup>10</sup> Susan Kroskey never felt like she got anything because she was a woman, but rather because of how hard she worked.<sup>11</sup> Shannon Bartell does not like hiring women in order to fill quotas, and wants people to understand why women are needed in the workplace rather than forcing increased female employment.<sup>12</sup>

William Chafe explains that job discrimination exists on two levels. The first is the overt refusal of employers to train, hire and promote women. The second is indirect result of societal ideas that discouraged women from entering certain fields of employment and aspiring for higher levels of employment.<sup>13</sup> At KSC, overt discrimination existed only in the most extreme circumstances. For example, despite her law degree, Sue Weisenegger was a secretary until NASA headquarters ordered her to given a higher-level job. However, these were the rarest of

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<sup>8</sup> Retha Hart interview, Rita Willcoxon interview.

<sup>9</sup> Retha Hart interview.

<sup>10</sup> Stacie Smith interview.

<sup>11</sup> Susan Kroskey interview.

<sup>12</sup> Shannon Bartell interview.

<sup>13</sup> William Chafe, *The American Woman*.

occasions.<sup>14</sup> As a federal institution, KSC was bound by laws requiring them to allow women access to all occupations and promote them to all employment levels. Indirect discrimination was prevalent during the early years of KSC. Women technical workers were treated differently and had different expectations than their male counterparts. *Spaceport News* referenced women technical workers by describing their feminine qualities and highlighting their gender as an unusual quality of employees in those fields. Many males at KSC assumed that women workers were secretaries, because that was a “normal” occupation for women at the time. They faced difficulties in gaining promotions, especially women without technical degrees. These ideas slowly evolved, and even though these instances of mistaken identity persist, it is no longer a surprise to see women in typically male fields. Fortunately, circumstances of indirect discrimination did not discourage women from pursuing their unique career interests.

Women’s experiences at KSC reflected the official views of NASA as understood through *Spaceport News* and employee data. As their numbers increased and *Spaceport News* discussed the merits of female employees rather than their sex, women’s experiences improved and KSC offered them even more opportunities for advancement and balance between work and home life. One can hardly believe that at one time female engineers in the massive Vehicle Assembly Building had to wear skirts and heels despite the fact that they walked across metal grates.

Over NASA’s forty-five year history, the number of women employees increased slightly. The NASA website states that “future predictions based on historical and current data for gender are as follows: percentage of female workers will slowly increase.” When analyzing employment data, *Spaceport News* articles and oral histories, as well as secondary sources, one can make the same prediction and also predict that the number of women in technical fields will

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<sup>14</sup> Pat Lowry interview.

increase, as well as the number of women in management positions. There are more women at Kennedy Space Center today than when it opened in 1962, especially in technical field and management positions. The largest percentage of females works in the professional administrative field. Their positions at KSC changed along with the women's movement and other outside factors. Females want to prove their worth as employees and be judged the same as male workers. Kennedy Space Center is a welcoming place for female employees, and continues to offer even more opportunities for women in every field and level of occupation. As a greater percentage of women enter technical fields like engineering and move up the career ladder, ideas about women's employment will continue to evolve until all occupations reach workplace equality.

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