

The Rockets Come to Florida

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At present, the United States is involved in the most costly peace time program in its history—Project Apollo which has as a goal the placing of Americans on the surface of the Moon. Such an undertaking includes not only the facilities of the Kennedy Space Center in Florida, but various manufacturing, testing, assembling, research, and administrative complexes scattered throughout the United States. Among these, the Apollo Project involves such awesome plants as Launch Complex 39 on Merritt Island, Florida; the rocket assembly plant at Michoud, Louisiana; the development, testing, and operations facilities at Houston, Texas; the Marshall Space Flight Center at Huntsville, Alabama; and the Bay St. Louis, Mississippi Test Center. Certainly, the aerospace business is most impressive and has changed in a most dramatic fashion the way of life in parts of the South including Florida.¹

It is the purpose of this article to review the period in Florida history when the initial rockets were launched from the area known at that time as Cape Canaveral. The setting, amidst pine trees, sandy beaches, and abundant wild life, was relatively primitive and costs were measured in terms of millions and not billions of dollars. In order to fully understand certain relationships, events which took place in 1945 should be mentioned. At the close of World War II, the United States Army had captured some German rockets, much technical data, and almost all of Germany's top rocket technicians, including Wernher von Braun, Walter Dornberger, and Kurt Debus. At first, the Americans did not know what to do with the materials and scientists, but finally, in "Operation Paperclip" four hundred and ninety-two persons were offered contracts to work for the United States Government. Within a short time after the Europeans had accepted the offer, they, together with approximately one hundred V-2 rockets and forty tons of documents, were dis-

¹ For the economic effect of the Apollo program upon the South see Loyd S. Swenson, Jr. "The Fertile Crescent: the South's Role in the National Space Program," *Southwestern Historical Quarterly* LXXI (January, 1968), 377-392; Mary A. Holman and Ronald M. Konkel "Manned Space Flight and Employment," *Monthly Labor Reviews* XC (March, 1968), 30-36.

patched to the United States.² By May, 1948, the 492 specialists had been placed in the various services: Army, 177; Navy, 72; Air Force, 205; and Department of Commerce, 38.

There were several important American projects for the development of guided missiles which must be noted at this time. As early as 1936 a group of California Institute of Technology scientists under the leadership of Theodore von Karman began research on the design of a high altitude sounding rocket and by 1939 had become involved in a group effort known as the Rocket Research Project—the first team of American scientists involved in research and development of propulsion systems. By November 1943, persons involved in the project had named it the Jet Propulsion Laboratory and Army Ordnance in January 1944, requested the laboratory to engage in research and development activities concerning long range jet propelled missiles.³ By December 1, 1944, the Private A, the first successful American missile propelled by a long duration solid-propellant engine was being successfully tested at Camp Irwin, California (Project ORDCIT). On November 15, 1944, a contract was signed with General Electric Company to plan and produce long range guided missiles and surface to air missiles: this was known as the Hermes Project.⁴

Even before the inauguration of the ORDCIT and Hermes projects, it had become obvious that a large area for the testing of missiles was needed. Finally in a wise choice, government owned land, near Fort Bliss, was selected by a committee and was activated as the White Sands Proving

² For details of "Project Paperclip" see Peter Van Slingerland, "How We Let the Missile Secrets Get Away," *Look*, (February 4, 1959); Wesley Craven and James L. Cate, *History of the Army Air Force in World War II*, VII (Chicago, 1955). The project as seen through the eyes of the German scientists can be found in Willy Ley, *Rockets, Missiles, and Space Travel*, (New York, 1957), 244-247; Walter Dornberger, *V-8*, (New York, 1954) (271-273; and Dieter Huzel, *Peenemunde and Canaveral* (Englewood Cliffs, 1962) *passim*.

³ Frank J. Malina, "Origins and First Decade of the Jet Propulsion Laboratory," in Eugene M. Emme ed. of *The History of Rocket Technology: Essays on Research, Development, and Utility* (Detroit, 1964), 36-37. Of course, Robert H. Goddard had received a patent for a liquid fueled rocket engine as early as 1914 but his efforts certainly could not be classed as a team project. For conflicting views concerning the start of the Jet Propulsion Laboratory compare Malina, "Origins," 60 and David S. Akens, "Historical Origins of the George C. Marshall Space Flight Center," *Marshall Space Flight Center Monograph Number One*, Huntsville, Alabama, December, 1960, 24.

⁴ Eugene M. Emme *Aeronautics and Astronautics, an American Chronology of Science and Technology in the Exploration of Space, 1915-1960* (Washington, 1961) 48; Francis E. Jarrett, Jr. and Robert A. Lindemann, "Historical Origins of NASA's Launch Operations Center to July 1, 1962," *Kennedy Space Center Historical Monograph Number One* (Cocoa Beach, 1962), 6.

Grounds (WSPG), New Mexico, July 13, 1945. Within a short time, both American and German rockets were being fired at White Sands which by 1950 became the upper atmosphere research center of the United States. Although the one hundred and twenty-five mile long range proved to be exceedingly useful for the testing of short range guided missiles and upper atmosphere sounding rockets, it was not adequate for the intermediate range guided missiles. Testing of a modified V-2 on May 29, 1947, for the Hermes B program brought about a most unusual turn of events. The rocket instead of going northward took off on a forty-seven mile trip to the south and after passing over a fiesta celebration at Juarez, Mexico, landed on an uninhabited hill.⁵ As a result, all launching activities were curtailed at WSPG until better methods were devised to protect the nearby inhabitants from straying rockets.⁶

The ideal missile testing range as initially proposed in November 1945, by the Guided Missiles Committee of the Joint Chiefs of Staff would be one which would be utilized by all branches of the armed forces and private concerns that wished to make certain tests. In order to find such a range, the Joint Research and Development Board, Joint Chiefs of Staff, established an organization known as the Committee on Long Range Proving Ground in October 1946, to study available sites and determine if a single testing area might be suitable.⁷ After considering and rejecting such foreign and domestic sites including Key West, Florida, an isolated area in Canada, certain islands in the Pacific, Cape Flattery, Washington, White Sands, New Mexico, and Point Arena, California, the committee headed by Brigadier General William L. Richardson, recommended in June 1947, as first choice the El Centro, California-Gulf of California range and second choice Banana River, Florida-

⁵ David S. Akens and Paul H. Satterfield, "Army Ordnance Satellite Program," *Historical Monograph*, Historical Office, George C. Marshall Space Center, Reprint, December 1, 1962, 43-44.

⁶ Probably there were other incidents regarding straying rockets in New Mexico and Mexico. One person recalled that the State Department did take care of some unpleasant incidents at Juarez and Alamogordo. See remarks by Lt. Col. C. T. Schooley, Minutes of Contractor Conference, March 6, 1951, at Long Range Proving Ground Division USAF, LRPG Division Contractor Conference, 4.4, Files, Office of Historian, Kennedy Space Center. Hereafter cited as O.H., KSC.

⁷ Marven R. Whipple Brief Explanation of the Origin and Lineage of the Following Entities: Headquarters, Air Force Eastern Test Range, Office of Information, etc.," Air Force Eastern Test Range, Office of Information, 1.

Bahama Island area.⁸ It was estimated that cost of the California range would be \$119,290,000 and it could be extended to 4,500 miles from its original 450 mile figure. The Florida range costing \$142,055,000 could be extended to a length of 10,000 miles from its original 725 miles. When preliminary negotiations revealed that Mexico was not anxious to have the range, the Banana River-Bahama Islands site was selected. Five years later, Pereira and Luckman drew up a master plan for the missile test center and in the introduction to that plan gave the following reasons why the Florida-Bahamas area had been selected as the site of the range:

1. The line of observation sites available on islands of the South Atlantic provided the greatest number of observation points over the longest range necessary for missile testing.
2. An existing naval air station within the continental United States was available which was considered adequate for use as a main support base.
3. A launching site was available fifteen miles north of the main base which fulfilled certain safety requirements in regard to distance from population centers.⁹

In anticipation of a satisfactory agreement with the British Government regarding use of sites in the Bahamas, the deactivated Banana River Naval Air Station was transferred to the Department of the Air Force, Air Materiel Command in September 1948, on a standby basis. A law which gave authority for the Secretary of the Air Force to develop a long range missile proving ground to be shared by the Air Force, Army, and Navy was signed by President Harry S. Truman on May 11, 1949. Finally, the Banana River Naval Station, was transferred from the Air Materiel Command to the jurisdiction of the Air Force Division and became an active base on October

⁸ *Report of Committee on Long Range Proving Ground*, prepared by Committee on LRPG, June 20, 1947, P.G. 27/4, Joint Research and Development Board. In addition, the committee recommended that a single Joint Range Proving Ground be established and that if the Florida site were accepted, part of Merritt Island be included in the tract. If this action were taken at this time, the United States Government would have saved a considerable sum of money by acquiring Merritt Island when land prices were much more reasonable.

⁹ Pereira and Luckman, General Master Plan, Air Force Missile Test Center, August, 1952, 4.11 O.H., KSC.

1, 1949.¹⁰ After all of these transfers of title, the most important transaction was signed on July 21, 1950—the Bahamas Long Range Proving Ground Agreement between the United States of America and the United Kingdom of Great Britain and Northern Ireland.¹¹ This pact gave the United States use of a one thousand mile range extending southeastward through the Bahamas and Antilles with observation stations situated at Cape Canaveral, Point Jupiter, Florida, Grand Bahamas Bank, Eleuthera, San Salvador, Mayaguana, Grand Turk Island, and Puerto Rico. When the range was opened, observers noted that it was capable of being extended five thousand miles to Ascension Island in the South Atlantic.

Among the many air bases and training stations established along the east coast of Florida during World War II, the Banana River Naval Air Station, situated some eighteen miles south of Cape Canaveral, occupied a most beautiful site between the Atlantic Ocean and the Banana River. Activated in October, 1940, the air station served as a base for the Martin Patrol Bombers which searched the nearby Atlantic shipping lanes for German submarines. Although the eighteen hundred and twenty-two acre base served a useful function, the total strength never arose above two thousand persons and when the war ended, the Navy found it relatively easy to curtail operations. On August 1, 1947, the station was deactivated and notwithstanding the services of a caretaker force of forty persons, the wooden buildings began to show signs of needed paint and repair work and persons speculated at what time the station would return to local authority for use as a college site or some other project.

When news reached Brevard County that the base would become headquarters for a missile range, civil leaders in Cocoa and Melbourne were

¹⁰ Land included within the Banana River Naval Air Station was transferred from the State of Florida on November 27, 1939; June 22, 1940; and November 22, 1940. The naval air base was formally opened on October 1, 1940, and deactivated on August 1, 1947. For life at Banana River Naval Air Force Station, see Patrick Air Force Base Newspaper, *The Missileer*, December 3, 1951 and December 10, 1951 issues. For a summary of the various transfers of titles and service designations see Marven R. Whipple, "Index of Military Units Assigned and Attached to AFMTC, 1949-1950", Historical Branch, Office of Information, Air Force Missile Test Center, Patrick Air Force Base, Florida, 1960.

¹¹ As early as January 18 and February 21, 1946, letters regarding range were exchanged between American and British authorities. In December, 1949, a team composed of Colonel Carl Swyter AF and Group Captain G. P. Woodhouse RAF visited Nassau and met with the acting governor of the Bahamas regarding possible station sites. For a copy of the pact signed on July 21, 1950 and correspondence regarding the matter see Bahamian Agreement File, Historical Division, Office of Information, Air Force Eastern Test Range.

indeed most pleased. The nearby communities had felt the absence of the air station personnel and now they wanted to demonstrate that they would do their best to show their appreciations for the change of fortune. Officials of the City of Melbourne scheduled construction of a sewage disposal plant and a two million dollar causeway to the beach. The President of the Cocoa Chamber of Commerce who had submitted a fourteen page report to Washington in the successful drive to have the area selected for the range site, reported "People are walking a little faster here today."¹²

Since the base needed extensive painting and other restoration work, efforts were made to up-grade gradually the appearance of the hangars, barracks, offices, and other buildings. When the Air Materiel Command, Air Force, received jurisdiction from the Navy on September 1, 1948, a limited number of Air Force repair and maintenance people were assigned to the base. When it was apparent that the installation was going to be changed from standby to active status, activities were accelerated, but witnesses state that the greatest amount of refurbishment took place after the base was declared active. On October 1, 1949, Advance Headquarters, Joint Long Range Proving Ground was activated with Colonel Harold R. Turner, U.S. Army, serving as commander.¹³ Turner served until April 10, 1950, when Brigadier General William L. Richardson took command and the organization was redesignated Headquarters, Joint Long Range Proving Ground.

Although the range headquarters had been established, the land and facilities for the actual launch area were not yet available. Situated approximately fifteen miles to the north was Cape Canaveral, one of the most historic sites in North America. Spanish treasure ships had used it as a navigation point on their trips northward from Havana, thence to the Bermudas and Spain. Six hundred and eighty-six acres on Cape Canaveral lay within the jurisdiction of the United States Coast Guard which had maintained a lighthouse for many years, but the greater portion of the Cape was

¹² *Miami Daily News*, May 5, 1949.

¹³ Joint Long Range Proving Ground Historical Data, October 1, 1949—December 31, 1941", compiled by Historical Office under jurisdiction of Public Information Office, Joint Long Range Proving Ground, 1950, 55-57. Headquarters, Joint Long Range Proving Ground (LRPG) had Division added to its title but effective June 30, 1951 Hq. LRPG was designated Headquarters, Air Force Missile Test Center. The air base went through a number of name changes. In May 1950, it was designated Long Range Proving Ground Air Force Base but in August 1950, it was named Patrick Air Force Base in honor of Major General Mason M. Patrick. For a well written account of these name changes see Whipple, "Brief Explanation".

owned and occupied by a varied group of citizens. In February 1950, the Coast Guard granted permission for the range to use what land was needed, and the government proceeded to obtain the remainder from the private owners. What could not be purchased by negotiation was acquired as a result of condemnation proceedings on April 17, 1950, and June 3, 1950.¹⁴ The 11,728.32 acre tract was designated Cape Canaveral Auxiliary Air Force Base on October 5, 1951, and was placed within the jurisdiction of the 6541st Missile Test Wing, Air Force Missile Test Center, Patrick Air Force Base.

Cape Canaveral, at this time, was indeed a comparatively unsettled but lovely place—complete with beautiful beaches, a cemetery, game refuge, excellent fishing, a lighthouse, scattered private residences, the Canaveral Inn (utilized as Cape Canaveral Auxiliary Air Force Base Headquarters), a few unpaved roads or trails, Canaveral Pier (a dock previously used by shrimpers), and a considerable population of wildlife including deer, rattlesnakes and millions of mosquitoes.¹⁵ In a clearing, made by first burning the underbrush and then uprooting the palmettoes with bulldozers, the construction of a concrete pad necessary for the launching of missiles was begun on May 9, 1950, and completed on June 20, 1950. This missile launch pad area was situated just north of the lighthouse. All land within one mile of the proposed launch site was cleared of underbrush.

The first rocket scheduled for testing at the launch site was the two-stage "Bumper" missile. The first stage was a V-2 rocket combined with the second stage "WAC Corporal". The "Bumper" had been developed as a result of a need to learn more about ignition, separation, and stability of second stage rockets and reflected the combined efforts in research of Army Ordnance, Douglas Aircraft, the German technicians, General Electric, and scientists from California Institute of Technology. From its beginning, the "Bumper" was successful; in a flight on February 24, 1949, from White Sands, the missile, speeding at a rate of 5,000 miles per hour, soared to the height of 250 miles. Altogether, six "Bumpers" were fired in New Mexico; but since the range's limitations in size prevented full scale testing, it was necessary to test the rocket at the newly established range on the Atlantic Coast.

¹⁴ Civil Actions 489 and 493 were filed in the United States District Court for South Florida, Whipple, "Index", 155.

¹⁵ Orlando *Morning Sentinel*, January 6, 1952.

During the 1950s, a suitable range was one on which the missile could be tested under actual conditions and information supplied by various measuring instruments situated along the range used to analyze missile design. The means of measurement which developed throughout the years ranged from visual observation to the most delicate of instruments including optical sightings and radar and telemetering receivers. The missile constituted a flying laboratory gathering data and testing design, operation techniques, and future developments.¹⁶ It was as Major General Leighton Davis explained: "If we suspected for example that a valve was not working properly we hooked a radio transponder to the valve inside the missile. The transponder would then transmit back coded data which told us what the valve was doing at any given point of time."¹⁷

The physical layout of the observation stations for the range scheduled for construction at San Salvador, Jupiter, Grand Bahama, and Eleuthera included instrumentation buildings erected by the Navy's Bureau of Yards and Docks on public land leased to the United States Government for twenty-five years by the British Government. Since it took some time to activate these various bases, the only stations that could be deemed operational by 1951 would be Canaveral, Jupiter, and Grand Bahama.¹⁸

In a memorandum dated October 20, 1948, the basic concepts of the JLRPG were stated. It was pointed out that the JLRPG was not a research or development instrument but solely a flight test facility. The contractor was expected to furnish the missile, assemble and pre-flight test it and fire the missile from a launcher provided by the contractor. Of course, the government would provide services of a basic nature including transportation, assembly shop, laboratory space, launching platform, utilities, fuel storage facilities, protection at time of firing for launch crew and means to record and observe the flight of the missile.¹⁹

¹⁶ W. S. Hines, "Development of Ranges," *Space Age Facilities*, Aero-Space Transport Division, Specialists Conference, Cocoa Beach, Florida, November 17-19, 1965 (Cocoa Beach, 1966), 88.

¹⁷ Address before Joint Session of the Florida Legislature, April 17, 1963.

¹⁸ Jupiter Auxiliary Air Force Base was ready for operations in June 1951, and supplied information for the test of the Matador on June 20, 1951. It was placed on stand-by status on September 23, 1953, Whipple, "Index," no page indicated. Construction was started on Grand Bahama Island in November, 1950, and the equipment was used on the first time for the June 20, 1951, Matador launch. *Missiles and Rockets VII* (August 1, 1960), 40.

¹⁹ Basic Concepts of the Joint Long Range Proving Ground, October 20, 1948 C 9-2406 AF JLRPG File 4.6 O.H., KSC.

There were two concepts concerning the location of facilities on a missile test center. One philosophy which was followed until 1955, stipulated that in order to insure desirable efficiency of support operations, there should be as many functions as possible situated on the base and only the actual launching operations be available at the launching site. The other point of view argued that missile assembly and launch operations should be available at the launch site but most of the major support functions be placed at the base. Opponents of this plan pointed out that once assembly of the missiles was moved to the launch area, other operations would follow and dispersion of the support effort would be uneconomic.

From 1950 until the summer of 1953, the philosophy of siting the principal support functions at Patrick and using Canaveral as a firing site was followed. The missiles were flown in to the Patrick field in sections, assembled in special buildings, static tested and made ready for launch by employees of the various missile companies. Finally, the missile was taken by truck to Canaveral for the firing tests.²⁰

The guidelines for the use of the range were as one officer put it so well in the following words: "We own the rifle range, you might say. You have a new gun; okay, you bring it and shoot it. We see to it you don't kill any bystanders and we tell you if you hit the target and if not, why not."²¹

It was the General Electric Company, assisted by other concerns and Federal agencies that brought the first missile, the "Bumper", for testing on the Air Force's range.²² General Electric prepared the missile for flight and were the ones to launch it. Other firms or institutions involved included California Institute of Technology which investigated modifications of the V-2 and WAC Corporal; Douglas Aircraft Corporation which engineered, designed, and fabricated the modifications; and Ballistics Research Laboratories which was responsible for in-flight data. The First Guided Missile Battalion from White Sands assisted in preparation of the missile for launching and other assistance. Actually, with units from the Signal Corps to install

²⁰ Pereira and Luckman, Grand Master Plan.

²¹ *Miami Daily News*, July 10, 1953.

²² The range was known as the Joint Long Range Proving Ground in 1949; in May 1950, it became the Long Range Proving Ground. When the Long Range Proving Ground Division was designated the Air Force Missile Test Center, the range by common usage was called the Florida Missile Test Range; a designation that became official in 1952.

and operate communications equipment, detachments from the Army for guard duty and ships from the Navy at Key West for off-shore instrumentation, this venture represented full cooperation from all of the Armed Services.²³

The "Bumper" was assembled in Building 312, Patrick Air Base by employees of the General Electric Company working under the supervision of Army Ordnance and military personnel from the First Guided Missile Battalion, White Sands Proving Ground and taken to the Cape in a Meiler-wagon: a vehicle which could place the rocket in a vertical position for launching. After the rocket was placed in the proper position, a gantry tower constructed of painter's pipe scaffolding was erected about the "Bumper" and scientific instruments installed. After working from midnight prior to launch time, the General Electric crew pumped into the rocket the liquid oxygen and alcohol fuel by 6 a.m. and placed aboard a destruct package which was capable of destroying the missile.

The first launch was scheduled for July 19, but everything seemed to go wrong and only a "popping noise" resulted. It was discovered that a fuel pump had failed. Bumper 7 was removed in disgrace from the pad, re-named "The Reluctant Dragon", and Bumper 8 roared from the launch pad at 9:29 a.m., July 24, 1950. The blockhouse shook as the crew inside crouched on the floor, but a successful launch had been made. The first stage of Bumper 8—the V-2 part, reached a distance of eighty miles, the second stage, the American designed Corporal went one hundred eighty-nine miles; the sum total making a successful launch.²⁴

After the two Bumper shots, crews representing other firms moved to the range. By 1956, it was said that eleven contractors working with missiles or missile sub-systems were busy testing their products. Included among these firms were Boeing, the Bomarc; Martin, the Matador; North American, the Navaho; Chrysler, the Redstone and the Jupiter; and Northrop, the Snark. In the testing of the Matador, more than one hundred Martin employees, mostly engineers, moved to Florida to assemble, test, and fire the missile.²⁵

²³ Brochure dated July, 1950, Public Information Office, Long Range Proving Ground Division, Cocoa, Florida.

²⁴ Walter B. Hendrickson, *The Study of Rockets, Missiles, and Space Made Simple*, (Garden City, 1963), 19. *Florida Times Union*, July 20, 1950. *Orlando Evening Star*, July 24, 1950.

²⁵ *Aviation Week*, LXV, August 6, 1956, 115-116.

The first step in the missile testing was the request by the contractor to the Wright Air Development Center for a test. If the missile were large and long range, it was scheduled for Florida. The contractors and officers of the 6541st Operations Group planned a definite firing schedule for one week and a second following week to take care of all flight abortions.²⁶ When all down range stations reported that all was ready, work began on the launching pad at midnight prior to the firing and all crew members worked throughout the night. All non-government planes and boats were cleared from the area and everybody was ready for the firing. Since the failures which resulted in a missile falling into the water needed investigation to determine what had gone wrong, an elaborate system of sea floor surveillance was arranged.

Louis Berger had a contract to recover missiles and bring them back to the Cape for analysis. Included in his task force to recover Matadors and Snarks was a fleet of three ninety-nine ton Army utility boats, each with a crew of three and two divers. Before the time for blast-off, the boat would be stationed several miles off-shore and listen to the events at Canaveral by radio. Difficulties encountered included poisonous propellants, explosives, dark waters, and the barracudas and other ocean animals that might move into the empty shells.²⁷

In order to secure good relations with the citizens of the Bahamas a team was organized by the public information officer at Patrick to tour the islands. A full size missile mock-up was built from discarded parts, loaded on a trailer called the "Blue Tail Fly" and was taken with the team. At each stop, they unloaded their balloons, rocket and charts and gave their talk in the school house, church or village square. They told the people about the use of the missile range, emphasized the need for recovery of missiles and as a climax fired up the rocket's pulsajet engine known as "Liberty's Stinger". It was a frightening, but educational experience.

With the movement of technicians and engineers from the aircraft companies to Florida for the testing of the missiles, a considerable number of civilian workers representing these companies could be seen at Patrick Air Force Base. In December 1953, the force numbered 506 persons; June 1954, 544 persons; and December 1954, 714 persons. Most of them stayed at

²⁶ *Aviation Week*, LIX, August 17, 1953, 178.

²⁷ William Shelton, *American Space Exploration*, (Boston, 1967), 21-23.

²⁸ *Aviation Week*, LIX, August 17, 1953, 176.

Patrick for the tests; only less than one hundred made their way to Canaveral for the actual missile firings.

In order to man the various instruments needed to record flight of the missile, pre-test them and provide various types of support for them, the work force at Patrick rapidly expanded. In December 1950, there were 1559 persons, including 98 officers, 697 enlisted men, and 764 civilians. By December 1952, the number had grown to a total of 6,983 which included 663 officers, 4,374 enlisted men, and 1,946 civilians. In mid-1956, the 9,500 persons serving the entire range included 4,000 employed by range contractors, 2,200 members of the military, 1,600 civil servants, and 1,600 missile contractor employees.

Relations between the Air Force which was manager of the range and the various tenant aerospace companies were good. No one questioned the authority of the Air Force to run its own range and the companies were pleased with the excellent facilities and high standard of test score results furnished by the Air Force. The situation became somewhat strained when personnel from Redstone Arsenal, Army Ordnance, Huntsville, Alabama came to Florida to arrange for the testing of the Redstone missile.³⁰ AFMTC pointed out that all missile assembly facilities were situated at Patrick, but the Redstone representatives with experience at security conscious Peenemunde and White Sands were not pleased with the fishbowl atmosphere at Patrick Air Force Base. They seemed to think that easy accessibility by land and sea made security difficult and "base gate guards and vehicle registration measures are ineffectual."³¹ Even more important they wanted the distance between where the missile was assembled and where it was launched reduced. When the missile was assembled at Patrick and launched at Canaveral, it was necessary to check out the missile at each point and time and money were

²⁹ In 1953, Pan American World Airways was given operation of the range by the Air Force. Radio Corporation of America served as primary sub-contractor. For an account of Pan American's activities see U.S. Congress, House of Representatives, Report of the Committee on Science and Astronautics, *Management and Operation of the Atlantic Missile Range* (86th Congress, 2nd Session), (Washington, 1960), 1-11.

³⁰ Officials of Redstone Arsenal showed interest in using the range as early as November 1951 when Captain James Hoey and T. M. Moore representing the Experimental Firing Branch visited Patrick. Even in this initial contact, the Ordnance people noted that assembly of the missiles at Patrick would delay the firing rate of the Major or soon to be named Redstone and the steady stream of visitors and phone calls from Alabama to Florida pressed for construction of assembly buildings at Canaveral. The files containing the reports of the various trips made by Debus, Gruene, and the others are found in Trip Reports 5.3.10 O.H., KSC.

³¹ Captain James F. Fail, Trip Report, July 21, 1952, *ibid*.

lost in the process. The facilities at Patrick were extremely crowded and the Redstone staff was forced to share space with the workers from Boeing and Northrop.³² Brigadier General Holger N. Toftoy, Director of Ordnance Missile Laboratories and prime mover of "Operation Paperclip", estimated that due to the crowded conditions at Patrick and the unavailability of proper facilities at Canaveral, the Redstone program was delayed from three to six months and each month's delay cost the taxpayers a million dollars. He made several phone calls to Patrick and exerted great pressure upon Major General William Richardson but finally decided that Richardson had done as much as he could do for Redstone.³³

During the period when the Redstone people commuted from Alabama to Florida they found some restrictions imposed by the Air Force as landlord, particularly irritating for at least one tenant. On April 23, 1952, Dr. Kurt Debus expressed it on the following words: "It has become increasingly difficult for Major Stempin to secure transportation within the Base and Cape areas, sufficient to accommodate R.A.'s (Redstone Arsenals) manifold business missions. . . . It was due to lack of transportation on two consecutive days that the undersigned had to stay in the Base area and could not attend telemeter operations nor preparations for the launching of a missile which was to be part of the mission of the trip."³⁴

Of course, when the Vanguard people wanted to share the Redstone facilities in the Fall of 1955, they were "turned down abruptly by the Army on the basis that any interference with the Redstone program would be harmful to the U.S. Ballistic Missile Program".³⁵ The shoe was on the other foot this time.

Actually, since only the Air Force budget could provide funds for any buildings to be erected at Canaveral, it is difficult to find great fault with the Air Force for it was the use of their land and money that Redstone wanted. It took some time for the matter to be resolved; but by January 1953, the construction of the assembly building at Canaveral was approved by the

³² Colonel A. C. Gay to Commanding General Redstone Arsenal, February 6, 1953, Completion of Facilities, 5.3.2, O.H., KSC.

³³ Transcripts of the phone conversations between Toftoy and Richardson can be found in *ibid.* For a survey of this 1952-1955 period see Jarrett and Lindemann, "Historical Origins", 31-38.

³⁴ Trip Report of Kurt Debus April 23, 1952, Trip Reports 5.3.10, O.H., KSC.

³⁵ John P. Hagen, "The Viking and the Vanguard", *The History of Rocket Technology*, Eugene M. Emme ed. (Detroit, 1964) 131.

Air Force and Department of Defense. Due to the delay in construction lead time, temporary facilities were used for the first shots but finally, adequate assembly facilities were available for the Redstone at Cape Canaveral.³⁶ It took almost as much time to approve and construct the small Redstone assembly building as it did to approve and construct Launch Complex 39 —“The Moonport”. Redstone Missile number one was launched from Pad 4 on August 20, 1953 by the Missile Firing laboratory. From that time until June 30, 1962, this MFL-LOD organization was responsible for some one hundred and thirty successful launches from Cape Canaveral.

Although missile firings were made under cover of military security, it was most difficult to conceal certain facts from those who lived near Cape Canaveral. No announcements were made of planned launchings in the press but yet when the time came, thousands of people lined the beaches for a view of the proceedings. Even those construction workmen who outfitted the Redstone assembly building needed security clearance but important matters concerning the Redstone were discussed by children in Brevard County schools. It was difficult to conceal a missile or news of a planned launch when a single thoroughfare connected Patrick and Canaveral and unusual traffic was sure indication of a possible launching.

Creation of the range had an enormous effect upon Brevard County. Prior to 1940, the economy depended upon citrus and truck crop cultivation, fishing, and raising of cattle. After 1950, the annual rate of employment growth rose by twenty percent, and more of the labor force moved into the manufacture of ordnance, instruments, fabricated metals, communication equipment, and electronic components and less into agriculture. In 1950, the per capita income of Brevard County was less than the average in Florida but it rapidly rose and passed the state and nation by 1964. Retail sales in Brevard County more than doubled between 1950 and 1955 and increased at an annual rate of eighteen percent.³⁷

Naturally, such growth brought grave strains upon the roads, public utilities, educational and medical facilities of the area. Housing was in

³⁶ The scheduled completion date for use of Missile Assembly Building D was March 1, 1954, *ibid.* For an account of the early Redstone days when the Missile Firing Laboratory people travelled back and forth from Alabama to Florida to launch the vehicles see *Spaceport News*, II, August 15, 1963, 4. The Redstone Program moved into Complex 5 and 6 and Assembly Building D in February 1955 and took actual possession in March 1955. The first ring from Pad 6 took place on April 20, 1955.

³⁷ “Labor in the South”, 35.

short supply and until sub-divisions began making rapid increases, converted garages, boat houses and other types of makeshift housing were commonplace. One witness claimed that two hundred dollars were charged for the rent of a two-room apartment and the owner insisted that the used furniture be purchased on a monthly basis.³⁸ Another told about renting a single hotel room without bath for one hundred and seventy-five dollars a month. Long lines in the food stores, doctors' and dentists' offices and on the roads leading to the Cape were a matter of life in "Missile Land". Prices seemed higher in Brevard than in the interior sections of Florida. Yet, bargains like beach front lots which sold for three hundred dollars were overlooked.³⁹ The high prices like the missile age had only seen a beginning in the 1950-1953 period and no one could forecast what changes would take place by 1968. Some of the finest minds in educational, scientific and business circles would be drawn to Florida by the missiles and certainly Florida benefited by this new type of citizen who looked not at the cattle or the beaches and blue water or the oranges but into the sky.⁴⁰

³⁸ Marian Van Atta, "Homestead on the Missile Range", unpublished manuscript.

³⁹ *Ibid.*

⁴⁰ This article was prepared by James W. Covington who is writing a history of the Apollo Launch Facilities under terms of a contract which was awarded to Florida Institute of Technology by NASA. He is grateful for assistance given by Marven Whipple, Chief, Historical Division, Office of Information, Air Force Eastern Test Range, and Dr. Robert Lindemann, Chief Historical and Library Services Branch and Frank Jarrett Historian Kennedy Space Center.

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