A CAREER IN THE US SPACE PROGRAM (1963 – 1999)

In October of 1957, the Russian government launched into orbit a small shiny satellite, Sputnik, Fellow Traveler of the Earth. I remember that it was during apple harvest time and my father and my uncle had kept all the children home from school to help with the picking. It was also worldseries time between Milwaukee and the New York Yankees. We would pick apples starting very early in the morning and this would allow us an extended lunch period which we would use to watch the game.

The game was interrupted numerous times to announce the Russian accomplishment. This event appeared very serious in that the word of the satellite spread over the whole planet in a single day. In the evenings one could see the shiny spec gliding across the sky. The scheduled occurrences were well advertised. I remember spending much time gazing into the sky trying to pick a moving shiny spec amongst the millions of stars that typically splatter across the dark New Mexico sky. This event also triggered the government to initiate an undertaking to equate and surpass this Russian accomplishment especially at a time when people's nerves were already frayed by the development of the H-bomb, and the impact of this unstoppable fellow traveler was overwhelming. Thirty days after Sputnik, they did it again. Only this time it was a live dog.

When I was in High School, I really enjoyed the science and math classes. My sister Angela had stirred my interest when she told me that with my preference for studies in the sciences I could become an engineer. Papers and magazines were constantly full with articles of where our space program was heading, the problems with trying to play catch-up with the Russians, numerous launch attempts which ended in failure, but also numerous successes such as with high altitude airplanes like the North American X-15. My father knew that I wanted to become an engineer. As an option he recommended studying business at the local college, St. Michael's, and then later could take over the home construction business he and my uncle owned. My brother wanted to study engineering also and we served as each others encouragement.

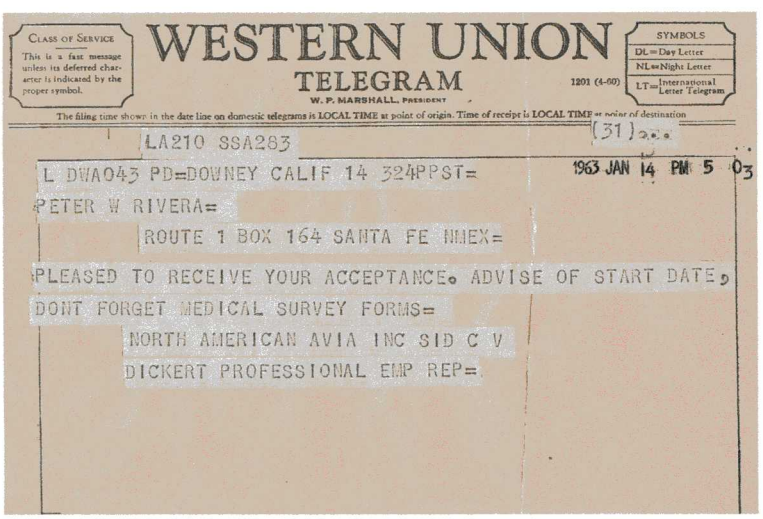
I attended the St. Michael's Catholic college my first year and then transferred to New Mexico State University where I pursued a B.S. in Mechanical Engineering. During that period the NASA agency had been formed and the US space program began scoring some successes. Satellites were successfully launched, the Mercury (one person space vehicle) blasted off from the sands of Cape Canaveral on May 5, 1961 with the first American, Alan Shepard, to leave the earth's atmosphere. Although he did not go into orbit, Shepard's flight had been a 300 mile parabolic flight, it was greeted by the nation with great relief. The Russians had also previously flown cosmonaut Gagarin around the earth for eighty-nine minutes.

In May 1961, President Kennedy made a State of the Union Address in which he said "...I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth...". He also went on to say "....No single space project in this

period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish...". The intellectuals of the NASA had named this program the APOLLO, the Greek god of light. The Apollo spacecraft would theoretically be capable of a voyage to the moon. The project would end with completion of all its goals and then some. It was very expensive and in terms of USA commitment it became larger then the Manhattan (Atomic Bomb) Project and the Panama Canal Project together.

In my senior year at the university, we started the interview process with potential employers. Engineers were in big demand which was primarily due to the many aerospace companies doing business with the NASA. Each graduating student was receiving numerous offers. I received numerous offers and then finally settled on working for the Space Division of North American Aviation which had been awarded as the prime Apollo contractor to build the Command and Service Modules, Saturn V booster, and the integration on the total program. My brother had already signed up with the Apollo in Downey, California and felt that the program would last many years. I looked forward to going to California. I had never seen the ocean. I had never been on an airplane and the company paid trip would be my first. I reported for work on February 4, 1963 to perform design work on the attitude and service propulsion systems. My starting salary was $585.00/month.

I lived with my brother and his wife for a few months until I could get settled. I came to California with a medium size metal trunk which contained the total sum of my belongings. I didn't own a car at that time and soon after a few paychecks signed up for a red 1962 Chevrolet Impala for $2,600. Teaming with another engineer, Will Baca, from New Mexico State, we rented a two bedroom apartment on Imperial Highway within walking distance to the company for the rental price of $110.00/month furnished



CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION
TELEGRAM
W. P. MARSHALL, PRESIDENT

1201 (4-60)

SYMBOLS
DL=Day Letter
NL=Night Letter
LT=International Letter Telegram

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination

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L DWA043 PD=DOWNEY CALIF 14 324PPST= 1963 JAN 14 PM 5 03

PETER W RIVERA=

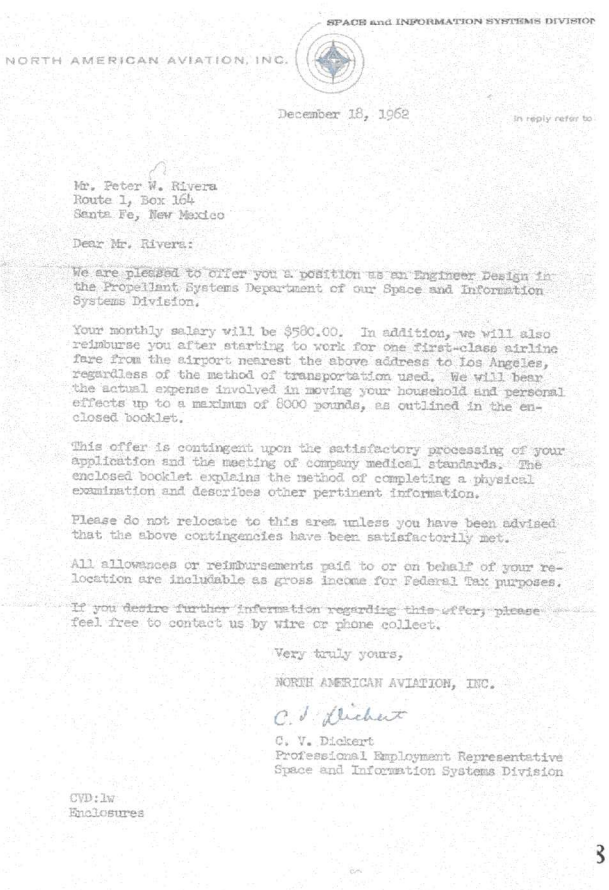
ROUTE 1 BOX 164 SANTA FE NMEX=

PLEASED TO RECEIVE YOUR ACCEPTANCE. ADVISE OF START DATE,

DONT FORGET MEDICAL SURVEY FORMS=

NORTH AMERICAN AVIA INC SID C V

DICKERT PROFESSIONAL EMP REP=



SPACE and INFORMATION SYSTEMS DIVISION

NORTH AMERICAN AVIATION, INC.

December 18, 1962

In reply refer to

Mr. Peter W. Rivera
Route 1, Box 164
Santa Fe, New Mexico

Dear Mr. Rivera:

We are pleased to offer you a position as an Engineer Design in the Propellant Systems Department of our Space and Information Systems Division.

Your monthly salary will be $580.00. In addition, we will also reimburse you after starting to work for one first-class airline fare from the airport nearest the above address to Los Angeles, regardless of the method of transportation used. We will bear the actual expense involved in moving your household and personal effects up to a maximum of 8000 pounds, as outlined in the enclosed booklet.

This offer is contingent upon the satisfactory processing of your application and the meeting of company medical standards. The enclosed booklet explains the method of completing a physical examination and describes other pertinent information.

Please do not relocate to this area unless you have been advised that the above contingencies have been satisfactorily met.

All allowances or reimbursements paid to or on behalf of your relocation are includable as gross income for Federal Tax purposes.

If you desire further information regarding this offer, please feel free to contact us by wire or phone collect.

Very truly yours,

NORTH AMERICAN AVIATION, INC.

C. V. Dickert

C. V. Dickert
Professional Employment Representative
Space and Information Systems Division

CVD:lw
Enclosures

The National Aeronautics and Space Administration
presents the
Apollo Achievement Award
to
W. RIVERA

In appreciation of dedicated service to the nation as a member of the team which has advanced the nation's capabilities in aeronautics and space and demonstrated them in many outstanding accomplishments culminating in Apollo 11's successful achievement of man's first landing on the moon, July 20, 1969.

Signed at Washington, D.C.
ADMINISTRATOR, NASA

Space Transportation Systems Division
Rockwell International Corporation
12214 Lakewood Boulevard
Downey, California 90241

Rockwell International

Walter Rivera
4042 La Concetta Ave.
Yorba Linda, CA 92686

SUBJECT: Letter of Commendation

The NASA Schedule "E", Operations Support, Award Fee evaluation for the period January through June, 1985 was recently received. NASA's overall rating of our performance was "Excellent" with a numerical rating of 94.50.

In the Orbiter Vehicle and Vehicle Subsystems area, our performance also was considered "Excellent", with the NASA evaluation indicating "During the reporting period, the contractor performed in an excellent manner in providing engineering design and analytical support to Orbiter vehicle operational activities and requirements."

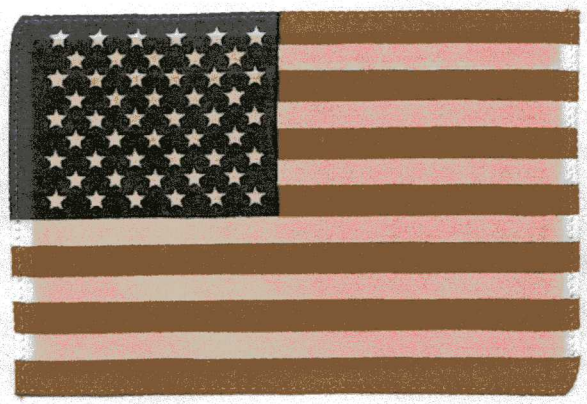
As Supervisor, OMS/RCS Requirements, you played a key role in our achieving this high rating. The NASA evaluation specifically cited the RCS area, indicating "Planning and management of the WSTF follow-on program for the ARCS and FRCS test articles were excellent. The follow-on program has demonstrated turnaround improvement time in propellant and helium loading and activation procedures. Efforts involved in the RCS area for failure analysis and anomaly resolution and checkout procedures for the flight vehicles were excellent."

Your personal leadership materially contributed to the high quality support provided and resultant NASA recognition we have received. Your effort, professionalism, and technical excellence are recognized and appreciated. Congratulations and thanks for a job well done.

R. E. Thomas
Chief Program Engineer
Orbiter Production & Operations

J. B. Peller
Vice President
Engineering

cc: Personnel Folder



This flag was flown aboard the second flight of the Space Shuttle "Columbia" (STS-2) November 12-14, 1981. It is presented to you in recognition of the significant contribution you made to the success of the mission.

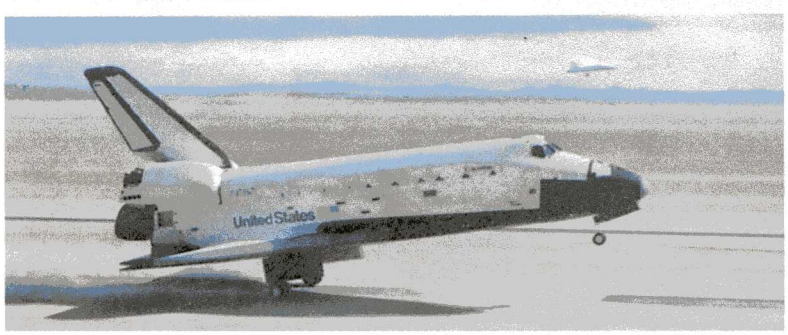
Presented to
WALT RIVERA

Columbia

Administrator, National Aeronautics and Space Administration

Astronaut Joe H. Engle

Astronaut Richard H. Truly

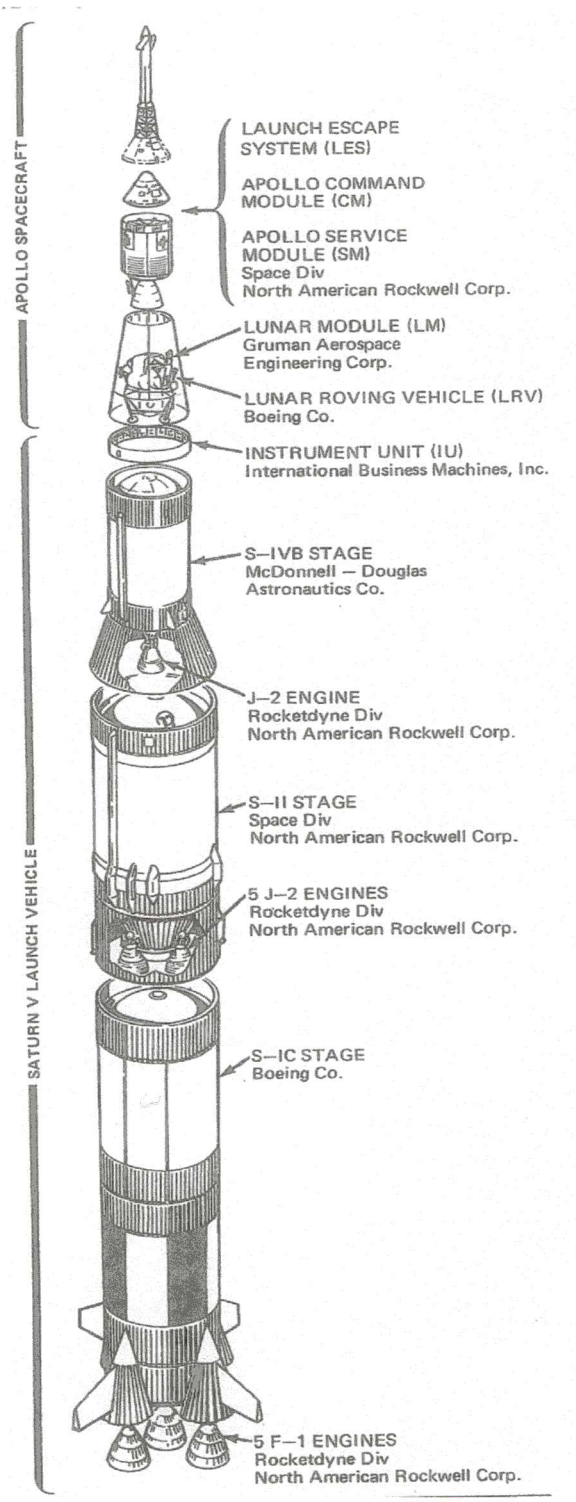


. My first year on the Apollo program working the propulsion design I was assigned to be on sight at Tullahoma, Tennessee at the Arnold Engineering Development Center, AEDC, to perform vacuum and thermal testing of our system in vacuum chambers. One occasion which really amazed me was at a get together dinner at the resident officers club with numerous engineers who had arrived from the Downey, California home plant to do a review prior to performing a major test. One engineer was very big and very dark and most likely of Mexican and native American ethnic background. We had all been seated and dinner place settings arranged. I noticed that the dark engineer was not given a place setting. At an opportune time I excused myself and intercepted the waitress. I asked why one of our people did not have a setting. She responded that it was because he was black i.e., he was a negro. I informed her that he in fact was Native American. He was instantly treated like the rest of us. This happened in 1963, in the South, at a USA military base.

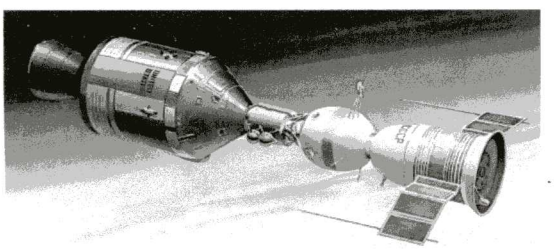
The program pulled in young and older engineers from all over the USA and from other countries

like a big magnet. A great majority appeared to be from State Universities and many from rural areas like in my case. There were recent graduates in my group from North Carolina State, Arkansas, Colorado, Purdue, Florida, Nevada, and many others including a good number from the local California schools. There were numerous engineers from England by way of Canada. Hiring was at such a furious pace that color coded lines were painted on the floor for people to follow through their processing to be hired.

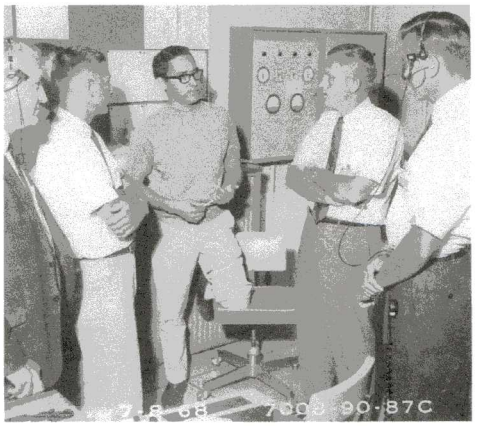
The Apollo program did land many astronauts on the moon and was able to bring all home safely. The landing itself was a celebration at our plant and also throughout the world. The Russians had been totally beaten in the ensuing space race. The road to this accomplishment was not without pain and setbacks. The major setback came with the loss of three astronauts due to a fire in the Command Module during testing at the Cape. The pure oxygen cabin environment was subsequently replaced with a nitrogen/oxygen environment more like our earth environment. Additionally, many other improvements were made including a quick opening crew access door. Another hair raising event was on Apollo 13 when an explosion of a cryogenic oxygen tank totally disabled the Service Module where a large portion of the propulsion systems, power supply systems, and consumables were located. This required the crew to transfer to the Lunar Module (already attached to the Command Module) and remain there for the trip around the moon and back to Earth. This mission had the whole world praying for the safe return of these astronauts.



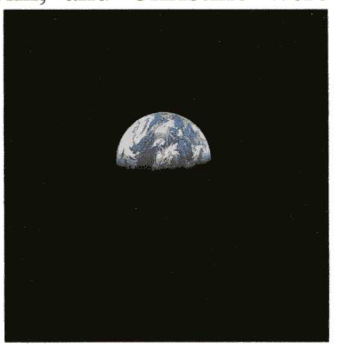
I worked Apollo from 1963 to 1972 where the final mission was a joint mission with the Russians and their Soyoz spacecraft. I worked the small rocket thruster systems and the intermediate sized service propulsion system. These systems were used to maneuver the spacecraft in orbit, to give the spacecraft the thrust to send it on its way to the moon and also from the moon back to Earth, and to provide the braking and entering steering for plunging the spacecraft back into the atmosphere for a splashdown at a designated ocean spot for recovery. My main contribution was in the performance of testing to confirm the design. I also worked the power systems which were comprised of fuel cells and ran on oxygen and hydrogen. This system provided electrical power and the byproduct was water which was used by the



crew. As a result of all the tests required, we were able to see numerous of the off-site test locations such as White Sands, Arnold in Tennessee, the cape in Florida, Houston Labs, and others. Testing also had the astronauts participating on occasion and the test team had a chance to work with them. On one of the missions, the crew left behind on the surface of the moon some scaled down copies etched on metal of our signatures. Whenever I take a prolonged look at a big full moon, I always think about the fact that my name is on the surface of the moon as testimony that I was part of that team.

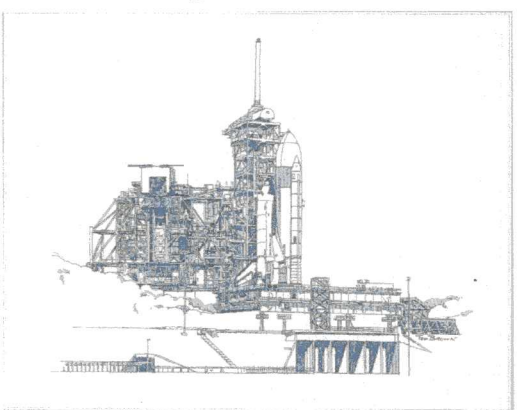


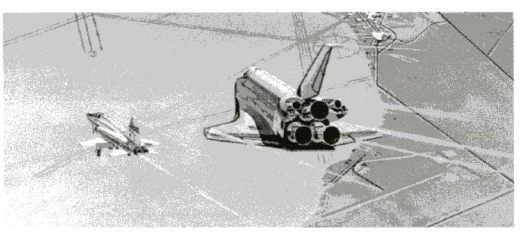
The years that cover the Apollo program were of much torment within other segment of our society and it was the accomplishment of landing on the moon which gave the USA something positive to cheer about. It was during those years that President Kennedy, Martin Luther King, and Robert Kennedy were murdered. Those years also had the daily reporting of the horrors of the Vietnam war and the civil unrest taking place in so many of our cities. On the other hand, those years were memorable for me in that I met Brenda, got married, Barbara, Walter John, and Christine were born, bought our first house, and took an forgettable trip to Europe.



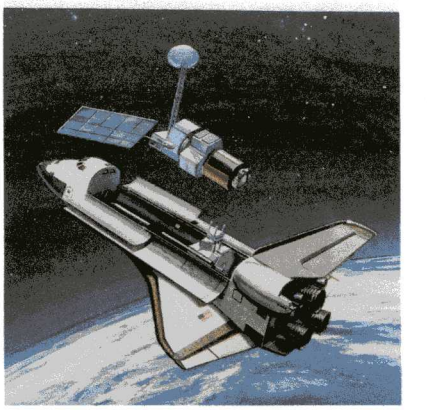
A DISCUSSION WITH APOLLO 8 ASTRONAUTS BORMAN (RT) AND ANDERS (LT);, FIRST HUMANS TO LEAVE EARTH AND CIRCULARIZE THE MOON (Lovell third crew member)

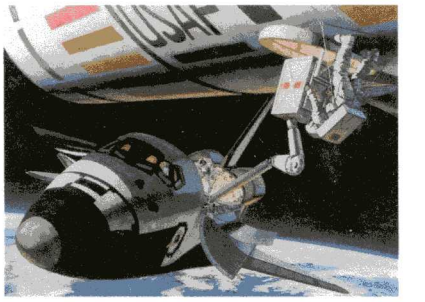
President Nixon announced the Shuttle program to follow on the heals of the Apollo. Our company, now known as Rockwell Corporation, entered the competition and won the contract to design and build a reusable spacecraft which could be launched like a missile into space and return to a landing strip like an airplane. It was a welcome contract to our company since just prior we as with the aerospace industry in general were going through some major layoffs. As with the Apollo, I continued to work on spacecraft propulsion and power systems. In 1978 I was assigned a supervision role with the design and test of the orbiter's Forward Reaction Control System and the test of the aft propulsion pods. In 1988 I was assigned a managers role with propulsion and power systems which included the auxiliary power system, the hydraulics system, fuel cells and power reactant systems, and the reaction and maneuvering propulsion systems.





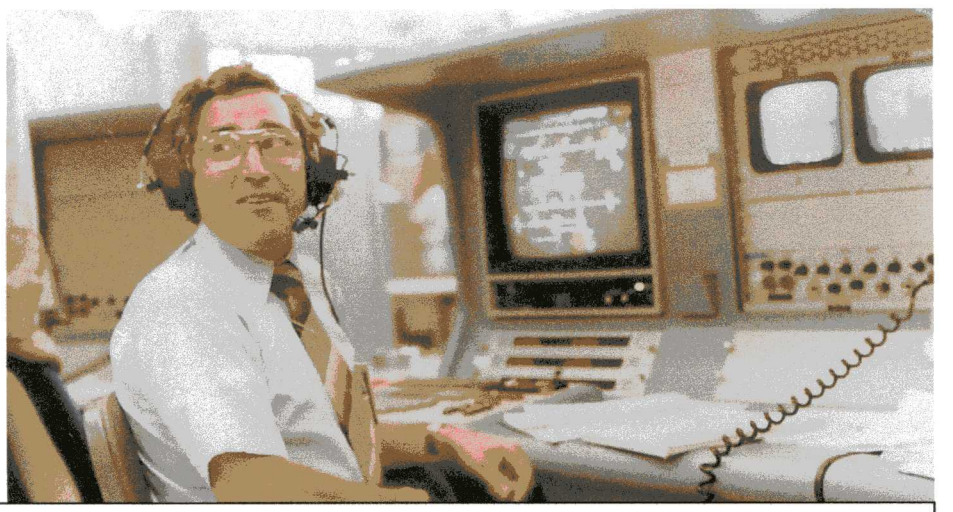
One of the highlights of this program to me was success of the demonstration of the landing capabilities. The orbiter is basically a glider with powered surface controls. The demonstration involved taking the orbiter piggyback on the Boeing 747 aircraft to high altitude and then separating to allow the orbiter to glide back to the landing strip. I was part of the engineering "go-no go"





team at Edwards AFB. The other major highlight was the successful first attempt launch of Columbia's STS-1. I was part of the engineering "go-no go" team at the Cape and witnessed the launch from the Launch Control Complex firing room. There were some setbacks of which the worst was the loss of Challenger during the ascent part of the mission. Seven Astronauts died in that accident and the program came to a screeching stop for about two years before another attempt was made. I was at the Downey Mission Support Room as part of the Downey Engineering support team for that flight and it certainly was a heartbreak to witness the explosion. I was at KSC when the first attempt was made to resume the orbiter flights and it was really gratifying to witness a successful launch. Another setback occurred during the servicing of propellants to the Forward Propulsion Module for the second flight of Columbia. A major propellant spill from a servicing coupling cascaded down the side of the orbiter doing extensive damage to the thermal protective tiles and additional damage in numerous areas from the corrosive vapors, which resulted from the propellant. This held up the launch for six months and during that time we were totally consumed in investigative work to define the problem and to come up with a design fix. Much time was spent at KSC looking over procedures, data, and reviewing the ground operations.

Flying manned spacecraft will always be dangerous business. Everything has to go right and there are too many cases where a malfunction could shorten the mission or destroy the spacecraft and crew. The Apollo set the standard for the rigors which had to be employed to ensure success and the USA space program has enjoyed many successes because of the importance it places on providing the crew with the safest space machine possible.

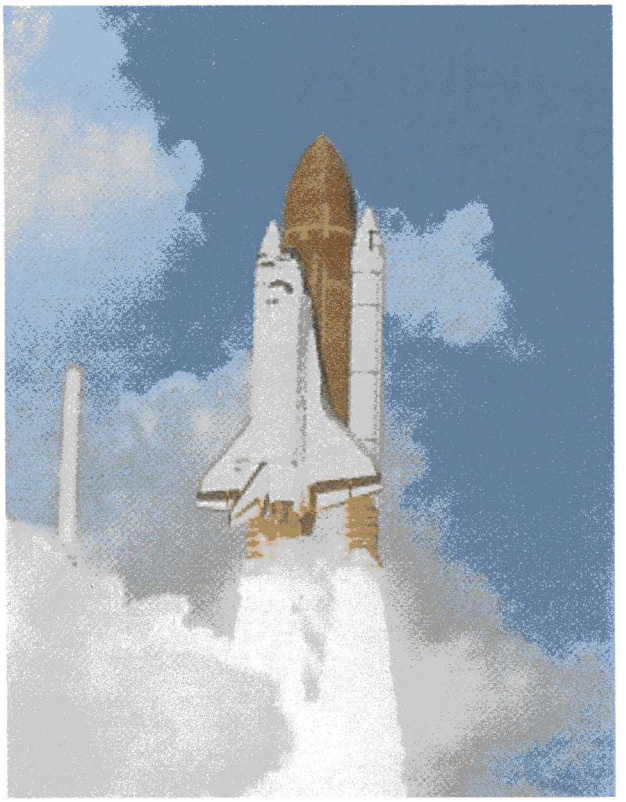


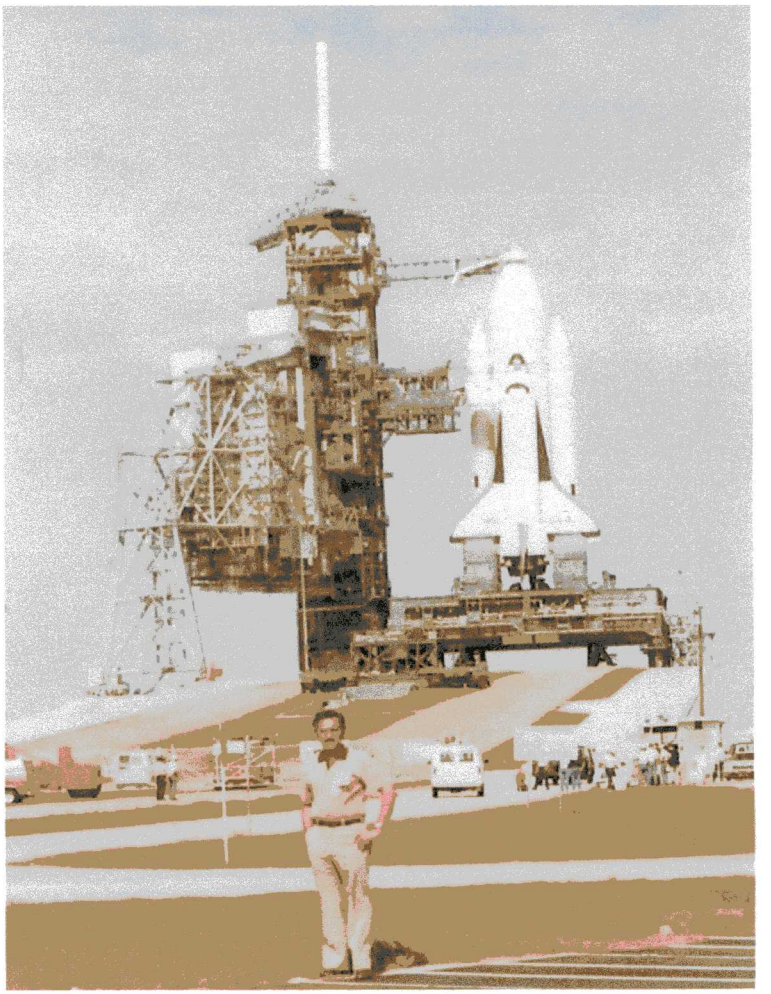
Following the first launch of Shuttle. Note monitor; Residual smoke at launch pad.

At times these programs required much attention and extensive time. During these times it was difficult to attend to other things beside those demanded from "the plant". Managing a home life was left up to Brenda so much of the time that in retrospect I begin to appreciate that her support and patience allowed me to give my job the best that I could. Our family was always aware of where the space program was and of upcoming events. On a number of occasions Brenda and one or more of the children would accompany me to the off-site locations; KSC, Edwards, Vandenburg, Palmdale.

Today, 2009, the Shuttle program is still going. It continues to place hardware in space and support outer space experimentation. It continuous to help in the buildup of the Space Station. Many Shuttle

flights will be required to finally locate all the necessary hardware in space to complete the station which will be roughly the size of a football field. The Space Station was a goal established by President

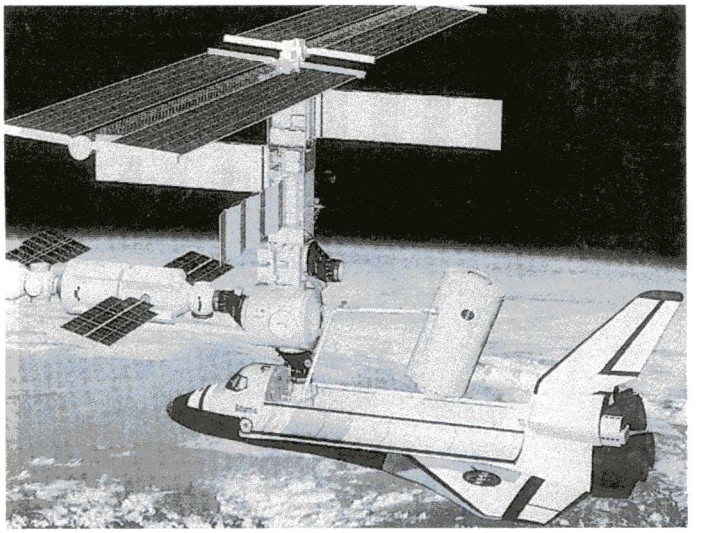




AT THE BASE OF THE LAUNCH PAD

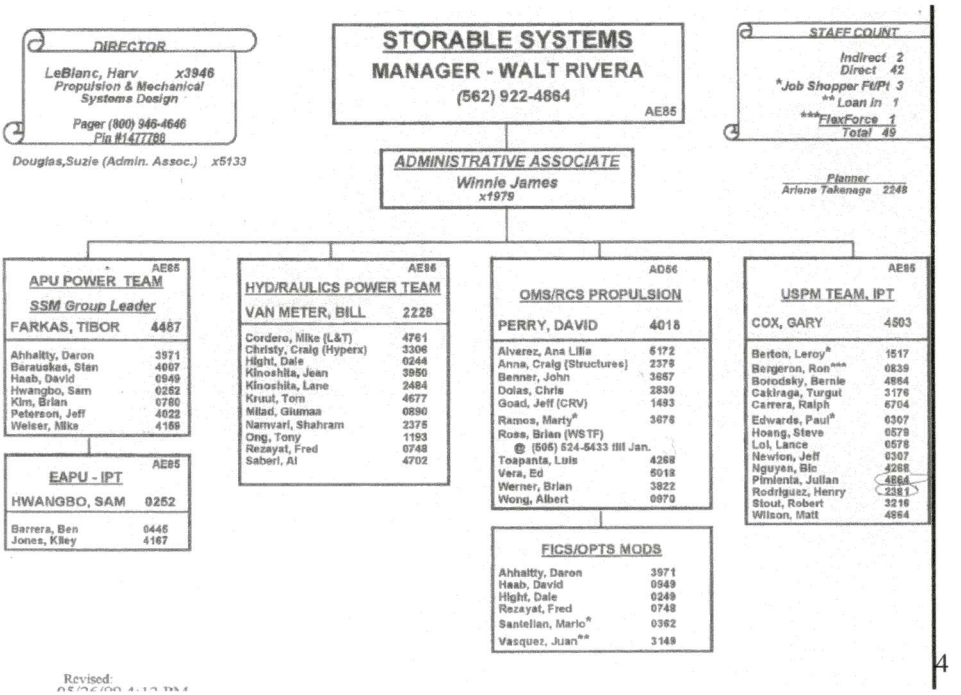
Walter was selected as Manager of the Year (1995) at the Space Division working on the Shuttle Program..

Reagan and awarded to the MacDonald Douglas Corporation as the prime contractor. A key contractor responsible for the power module is the Rockwell Rocketdyne Division. The NASA has been continuously redefining the Station configuration at the request of President Clinton because of concerns from the administration that the cost if not affordable by the USA. The Station as presently defined requires that the Shuttle transport the Station hardware into orbit for assembly. One option looked at was a smaller station which could be placed in orbit in one launch. Today the USA and the Russians are in total cooperation. The Russian hardware; Soyuz, Muir, and Energia are being looked at for incorporation into the USA space goals. A contract was signed between Rockwell and the Russian space agency for joint work on a docking method to allow the orbiter to dock to the Muir space station. The docking occurred in 1995 and numerous dockings followed.



The Sputnik launches by the Russians created the competitive USA/USSR environment and for me an interest in Aerospace engineering. It may be that before I complete my career I will work with the Russians in a joint design goal. Another gratifying situation which Brenda and I feel very proud about is that Barbara and Tim are both involved with the Space Shuttle program and Walter John worked on this same program for one summer while he was attending UC Irvine. In 1995, Barbara was awarded the astronauts prestigious "Silver Snoopy Award" and it was presented to her by Astronaut Norm Thaggard who had just completed his stay with the Russian crew in the Muir spacecraft for many months. Also, in 1995 I was awarded the Manager of the Year award for the Downey Space Division.

In the thirty-three years with the space program my salary went from $585.00 per month to more than $8,000.00 per month and California housing went from roughly $25,000 to $275,000 for a comparable house. The price of a luxury auto increased from roughly $6,000 to $27,000 and gasoline increased from 20 cents to $1.50 per gallon. The APOLLO was designed on vellum paper with most analysis performed on slide rules and four function calculators. Today computers are common place on every engineers desk and design is performed with computer aided design and manufacturing programs. APOLLO and Shuttle pushed the need for fast computing on a grand scale and the results have affected our life in every way. In 1995, the Shuttle

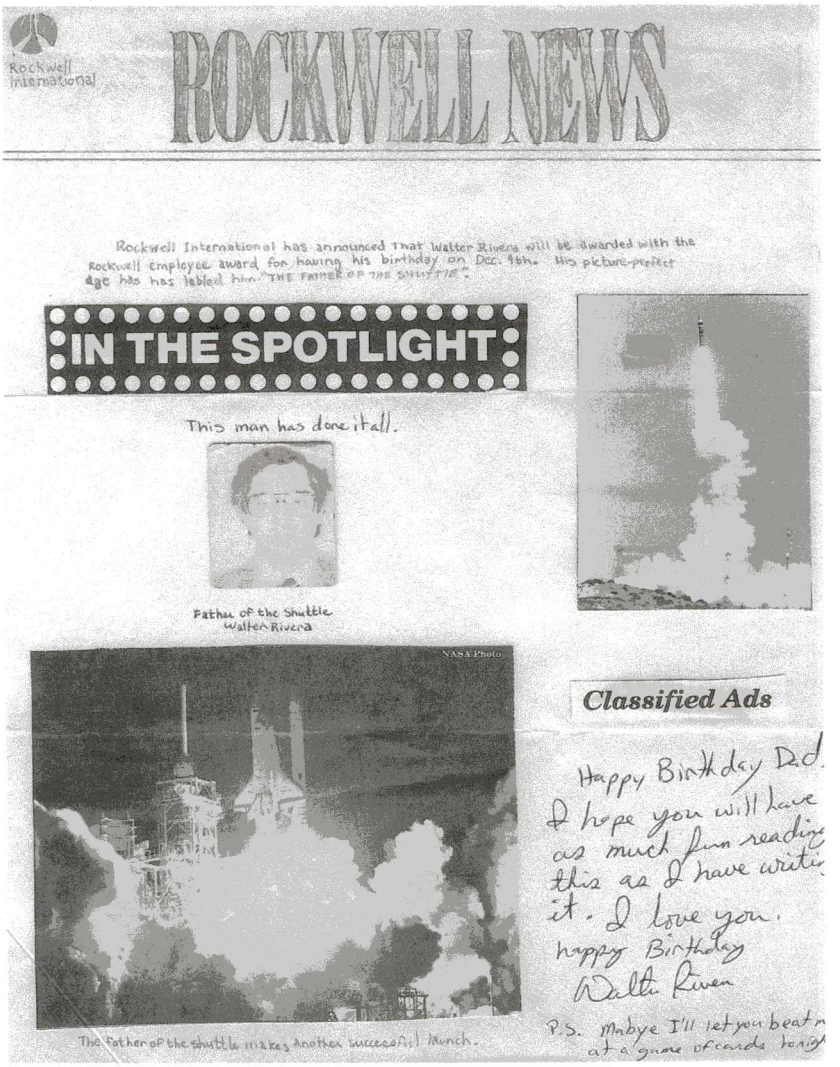


Revised:

Orbiter orbited and docked with the Russian Muir spacecraft and our astronauts and their cosmonauts were able to share each others habitat. Many more missions with joint goals are planned and in addition the Russians are playing a large role in the Space Station architecture.

The "Cold War" with the Soviet Union was over, the Soviet Union had broken into numerous separate countries with Russia being the predominant. In the U.S. the need for extensive participation by the aerospace and defense industry begin a steady decline. The larger aerospace and defense companies begin a consolidation into fewer numbers and many of the smaller firms simply went out of business. In December, 1996 Rockwell sold the aerospace and defense divisions to The Boeing Aerospace Corporation. Rockwell would continue as basically an electronics/communications company with no direct involvement in government aerospace or defense contracts. We were very satisfied with our new association with Boeing. Just as in the days when we were an aircraft company as North American Aviation again we would be with a strong aircraft company and our divisions were made a subsidiary with the name Boeing North American. Soon after this acquisition, Boeing acquired the MacDonald world.

NOTE;I retired in June of 1999 from Boeing. In February, 2003 the Shuttle Columbia was lost during re-entry from a mission. The cause was some initial damage to the protection thermal control system from some falling external tank foam at liftoff. I returned for a brief time to help


Rockwell International

ROCKWELL NEWS

Rockwell International has announced that Walter Rivera will be awarded with the Rockwell employee award for having his birthday on Dec. 4th. His picture-perfect age has has labled him "THE FATHER OF THE SHUTTLE".

IN THE SPOTLIGHT

This man has done it all.

Father of the Shuttle Walter Rivera

NASA Photo

The father of the shuttle makes another successful launch.

Classified Ads

Happy Birthday Dad. I hope you will have as much fun reading this as I have writing it. I love you. happy Birthday Walter Rivera

P.S. Mabye I'll let you beat m at a game of cards tonig

This is a piece of artistic style made by Walter John which I enjoyed