Chapter 3: The Cold War Midlife

Of course my Army life of the previous chapter was very much the Cold War, but likewise the 4 years following when I was setting and testing ICBMs in silos. After discharge from the Army in the spring of 1961 at 23 years of age I was headed to Washington state to my new job as Field Engineer. While still in the service I had responded to an advertisement and interviewed at a Philadelphia hotel for the job with Martin Aircraft (later Martin Marietta – the ultimate in diversification, a farm silo company – maybe they got mixed up about ICBM silos). At this writing Lockheed Martin. After a brief visit on my parent's farm in Gastown, western Pennsylvania, I set off across country in the Pontiac. One stop I remember at a motel in St. Louis, the Gateway Arch did not exist yet, I put my wallet under the pillow. Next day I drove a lot of the day before stopping for gas and finding that I left the wallet. There was no easy way to call back so I had no alternative but to drive back, so I left my wrist watch as collateral for the gas and set out. In strange surroundings I was perhaps even lucky to find the motel, but fortunately did so and was able to retrieve the wallet with all its contents. Luckily all that was lost was a day of travel and two tanks of gasoline after reclaiming my watch and paying for the gas next day. The trip continued with an adventurous drive through beautiful and unfamiliar country across Montana and Idaho. I stopped overnight to visit with one of the Latimer (Bracken) daughters and her husband in Spokane.

Upon arrival I shortly got an apartment, but in a month left that and got another on Lake Shore Drive right on the lake with a boat dock. There was very little to do recreationally in Moses Lake but visit the night club bars evenings and water sports on the lake days and often early evenings. We joked that every other driveway down the street had a boat on a trailer. My dock, shared with other less active tenants, was a very popular place to meet, drink beer, and serve to launch water skiers. In a very short time I was water skiing and soon on a single ski. The lake, a huge irrigation reservoir, did not have much in and out flow so was very warm for a really long summer season, though some locations were prone to algae growth. Summer weather is hot! It was also popular fishing venue. Grand Coulee Dam and Lake Chelan were good for a weekend trip. Windsurfing did not exist yet so the Columbia River Gorge was not yet the attraction that evolved with this sport after the 80s.

The work life was centered in an office on Larson AFB for the first few months while early heavy construction was happening at the three surrounding missile silo complexes. My recollection is poor, but mostly studying drawings, reviewing test procedures and having no idea what the hell I was doing, but diligently going to work every day trying to remedy my ignorance. In a few months Martin technical equipment began arriving and we moved out to the missile sites. Each of 3 sites had 3 missile silos. Each silo is accompanied by an Equipment Terminal and a Propellant Terminal, the latter where 1st and 2nd stage liquid oxygen (LOX), ~ 10,000 gal and 6,000 psi helium were stored for loading on the missile during a launch countdown. My job became Test Conductor in charge of one silo. A 3 silo and missile complex is sown by Figure 3.1 described in some detail at the link and the numerous links on the page. My position was to be in charge of all operations in a single silo with my office in the Equipment Terminal. There were tradesmen of all kinds active, riggers, steel workers, welders, pipe fitters, plumbers, electricians, etc. Most construction and facility equipping was basically finished but there were hundreds of incomplete and erroneous items to be cleared. The bane of my life became the civilian Air Force quality control inspectors who would show up every day with a new list of squawks on every imaginable part of the facility. We had to

find the appropriate trade and supervise their correction of the faults and get the result sold off to Air Force inspection. Often the intended drawing fix would be impractical so we had to get design modifications and get them sold off to all parties and finally the Air Force. As a facility drew near completion stage the extensive Martin Co. control and missile checkout electronics would begin arriving for installation and test in the silo and Equipment Terminal, followed by the missile. Ultimately we had to demonstrate a successful countdown sequence aborting just before 1st stage engine ignition for the Air Force to complete the turnkey contract. Major steps of the launch countdown were loading of cryogenic propellants in both stages and pressurizing with helium from the propellant terminal storage, roll aside the 50+ ton silo door, raise the elevator with many umbilicals, gas, liquid and electrical, disconnecting on the way up and complete various navigation and readiness checks when the missile was fully raised. This count down sequence was about 15 minutes.

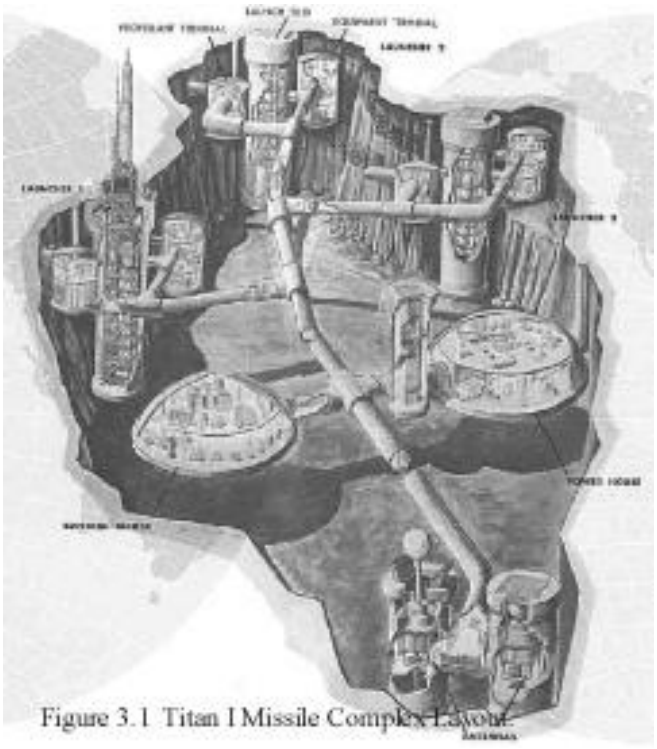

Figure 3.1 Titan I Missile Complex Layout

In May of 1962 I was awarded a Gold Titan for good performance along with about five others at Moses Lake. By August of 62 we had completed turnkey of all three missile complexes to the Air force. On a couple occasions in 1961 I traveled to the main Martin facilities in Denver for training and various consultations. We traveled sometimes on DC 3 aircraft with stops in Laramie and Cheyenne, Wyoming and Kalispell, Montana. On one weekend, while in Denver, we traveled to Berthoud Pass, 11,300 ft. and an engineer and private pilot who was along said he was higher than he had ever been flying – not counting as a passenger in the DC 3s. On another occasion we went to Denver Stapleton Airfield to see a parked Boeing 707, the 1st commercial jet airplane in the US – introduced in 1958. On one or more of these trips I met the Section Secretary at the Martin office, Pat, at work, who was to occupy a long term role in my life. In the later stages of our ICBM installation there were frequent "real engineers" with degrees who had designed parts of the missile and equipment coming to Moses Lake to help iron out the problems. These folks, away from their Denver home and family, often hung out in the bars at night and frequent conversations would lead to their telling me I should get into college. Also in early 1962 I traded the yellow Pontiac Catalina for a new Bonneville convertible with white body and blue cloth top.

By August 62 we had completed turnkey exercises on all the Titan I missiles and many employees were receiving new assignments to work on Titan II. My new assignment was to Tucson, Arizona. I had something like three weeks or a month to get there and travel and moving expenses all paid. This allowed me to take a great vacation and tour many attractions getting to Arizona. First stop was the 1962 Seattle World Fair or otherwise labeled Century

21 Exposition. But also many National Parks, viz.: Lassen Peak, Redwoods, Yosemite, Sequoia, and Grand Canyon all in one month. Highlights of the Fair were the Space Needle, which I did not go up as I was not too much into high places – a penchant to change 40 years later at the Sidney Tower! Also the Saturn V rocket engine, later to start Americans toward the moon, was on display. This was massive even compared to the Titan I that I am so familiar with.

Also I visited many west coast sites including Los Angeles, Knots Berry Farm, Disneyland, and notably Las Vegas city and strip. Arguably, some of these were in an earlier and better day than at this writing. Many less crowds, in Las Vegas as you dumped nickels in the slots and pretty waitresses handed out drinks and great lounge shows were frequent with no admission charge. Passing through the small town of Seaside, Oregon, I saw kids washing cars which I mistook for a high-school class benefit. I drove in with my new convertible and an American Legion guy thought I was a local, there to drive in the Miss Oregon Parade escorting a contestant. In the conversation that ensued I became an escort car in the parade. Not much connection ensued with the Miss Oregon contestant that I escorted, but I did get invited to a fun party for the afternoon. However, by dusk we had plenty of beer and the conversation was turning to drugs, marijuana mostly, and I had no interest in that so moved on.

Upon arrival in Tucson the missile installation work was managed out of Davis Monthan AFB. There were 18 missiles, unlike Titan I, there was only one missile per site which consisted of a silo and an underground control center. Groups of 9 silos were fanned out in three directions from the city. My job was quite similar to the Titan I work managing aspects of final construction followed by installation, test, and exercise countdown for each missile. The ground infrastructure was much simpler than Titan I, owing mostly to the storable propellants that were loaded at missile installation rather that during the launch countdown. This largely accounted for a countdown shortened to 2 – 3 minutes, compared to Titan I's 15 minutes.

The storable propellants were fuel, UDMH, and oxidizer, dinitrogen tetroxide, which are hypergolic – meaning when mixed they ignite. A period of great stress and excitement happened a couple months before completion of the project. The 1st stage of the missile is essentially a long cylindrical tank with inverted dome-shaped bottom, full of oxidizer and positioned vertically over a similar dome topped vertical fuel tank. At some point leaks began appearing in the oxidizer tanks with oxidized dripping on, trickling down and corroding a track in the top dome of the fuel tank. If this corroded through the tank a catastrophic explosion of the entire missile would result. Over a few very very tense days all the missiles were unloaded safely. A new and much more sensitive leak check procedure was developed replacing the nitrogen gas with the small molecule helium gas and a mass spectrometer instead of the soap bubble nitrogen check. Fortunately this passed with no disaster. A propellant leak at a silo in Arkansas in 1965 asphyxiated 53 contract workers, though the missile survived. Years later, 1980, a missile in the Little Rock complex did explode destroying silo and missile as a result of an accidental rupture of the fuel tank. "The initial explosion catapulted the 740-ton silo door away from the silo and ejected the second stage and warhead. Once clear of the silo, the second stage exploded."

Tucson weather is idealic, and it was a great time to be there as a well paid single male like myself. There were many hotels and dance night clubs, all essentially within a day's drive of the entertainment capitals of Las Vegas and Las Angeles. We frequently had transient

entertainers on stage, in piano bars and dance band stands with names like Buck Owens and Barbara Streisand, the latter in the beginning days of her career. Sometimes easy to get acquainted with these individuals who were more of less stranded alone in a strange town for a week or two. For the first few months I lived in an apartment building of about 8 units on a single level with a pool on N Tucson Boulevard[1]. Later I became acquainted with the young pastor of a church I was attending who was renting rooms in the brand new house the church provided him on Shadow Mountain Drive and moved to there to this new and prosperous housing area. Also, as in Moses Lake, there were many "real engineers" temporarily away from their Denver home and family, frequenting the bars with me and again telling me "you should go to college." It happens I did get my first exposure to college in Tucson. I enrolled in a computer programming class at University of Arizona. The school had an IBM 650 computer about the size of two refrigerators. We learned to program in machine language, binary, with 4-bit words like 1011 = STO for store, 0101 = ADD[2], etc. transferred to punched cards to be read by the computer. Results were retrieved from a printer. This didn't seem to me to require much academic preparation other than to know the operations of arithmetic.

I got another new white with blue Pontiac Bonneville convertible while in Tucson. One Friday night I came out of a dance club on N Oracle Rd. and the Bonneville was gone, though I believe I noticed a very similar one a few spaces away. I got a taxi home and notified the police. Near the end of the weekend the police contacted me reporting that someone reported having the car by accident. Apparently this person had mistaken my car for theirs, surprisingly his key fit, and with the help of a little alcohol he drove it home, only to wake next day and discover a lookalike but not his car in the driveway. It was returned and deemed a forgivable mistake by me and the police.

By fall of 1963 after about 18 months in Tucson the Titan II installations were completing and field personnel like myself were scrambling for other work and being laid off. I managed to get an assignment doing some sort of modification or upgrade work on Titan I. I have zero recollection of what this work was about. However it provided transient assignments at Denver Lowery AFB, 3 months, Rapid City SD Ellsworth AFB, 4 months, and back to Moses Lake with a brief visit to Chico, Ca., for a short time. This led at the end return to Denver to be laid off from Martin in summer of 1964.

Now being unemployed I got a rather frugal basement apartment on Clarkson St. near downtown Denver and signed up for unemployment compensation and job search help with the government unemployment office. To continue drawing unemployment dollars I had to show evidence of job searching. The technical employment situation seemed by now to have drastically changed from the wealth of opportunities that presented around Philadelphia three years earlier. There was only one prominent technology company around Denver, Martin who had just laid me off, and not much to respond to in the newspapers. I was walking the streets knocking on the doors of TV repair shops being turned down and just collecting data for the unemployment office. From having unlimited challenge and living a great independent life, this was suddenly the low point of my entire life.

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[1] In later years I have passed through and visited friends in Tucson often. In 2017, 55 years later, I visited both previous addresses. Tucson Blvd. was indistinguishable from 1962, while Shadow Mountain seemed an over grown desert slum such that I couldn't recognize the area.

[2] Later machines allowed just putting the characters ADD, STD, RCL, etc. on the cards, termed "assembly language" allowing much less tedious coding. The link shows a sample program that I do not recognize.

It is difficult at this writing to recall the chronology of events 1964-65 in very accurate detail. Pat, whom recall we met at Martin in perhaps late 61, had been dating occasionally and by 64 regularly. We married in Oct. 64. At some point along the way Pat had quit working at Martin, which was a long commute south of Denver to Waterton, and begun a new job at Southwestern Bell. In the absence of employment prospects, all those barroom conversations with engineers about college began to come to the surface. Several states were claiming me as resident to pay income taxes for 63 – 64, but none as resident to attend a state college. I was closest to residency in Colorado. Meantime I had no qualifications for entry into college, especially to study engineering. Back at Elderton High School in Pennsylvania I had mostly chosen agriculture courses, then not seeing beyond the farm, and completely avoided all the advanced math that at the time I seemed to have no aptitude for. At some point I learned the University of Colorado (CU) ran some nighttime continuing education courses in 'the old bus barn' next to downtown Denver, and that one could get into math classes by passing an entrance exam with no consideration of academic history or state residency. Further, a) one could still accumulate time toward state residency while taking the extension courses, and b) upon subsequent application for admission to CU with sufficient extension credits, only these would be considered and prior high school preparation was ignored. Here was my path to gain residency and be admitted to college. But, what about those qualifying exams to get onto the continuing education classes?!

Somehow I was in possession of a small yellow paper back 4" x 6" beginning algebra book. I began to study this all day and often night in the basement Clarkson apartment. There was one of those engineers from the barroom conversations above in town that I was casually in touch with, I think it was Ed Rogers. I was sometimes able to call him up and get a little coaching on tough points, but apparently I taught myself algebra that summer in a hot basement apartment. I don't recall if it was fall 64 or spring 65 quarter, but I took the qualifying exam and got into the math extension course. I quickly got quite interested and challenged and did well over two courses from *University Mathematics*, from Britton, Kriegh & Rutland, 1965, books I still have. On this path, by fall of 1965 I had Colorado college residency and adequate credentials to be admitted as a full time freshman student at CU. In September I moved, with my wife Pat, to Boulder, Co. to begin education in the CU College of Engineering.