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MY VACATION



*or Getting lucky and Stumbling Across a REAL NIKE MISSILE SITE!

by Will Meyerriecks

Photos by Dan Wilson, Milton Halsey (Park Service), and Will Meyerriecks

Last August my good friends and buddies Al Turner, Dan Wilson and I went on one of our typical vacation treks. We combine sight seeing, camping, and rocketry (if possible) into a whirlwind two week vacation. Because LDRS was being held once again at the amateur rocketry site of sites, the Black Rock Desert dry lake in north-western Nevada, we decided to change our destination from the usual Colorado, Wyoming and Utah route to some new country - California.

The trip began descending into the smog of LA. After a quick visit to the famous C and H Surplus store in Pasadena and fueling up at a really great Mexican restaurant, we were on our way. We stopped at Edwards AFB, but to our misfortune most of the exhibits were closed. We did get a chance to see the outdoor aircraft and lifting-body displays. I found it a bit disconcerting that the children's character "Alf" was piloting a NASA X-29! We also saw the actual NASA Gas Station where they fill the Space Shuttle up (premium, we hope). One small museum was open, and within were some interesting exhibits including a Side-winder and the rocket engines used to power the X-1 and the X-15. We knew things could only get better, and they did!

Onward we traveled to the Troma

Pinnacles outside of China Lake, a refreshing excursion to a waterfall near Death Valley, camping in the mountains, and up to Mono Lake. The tufa formations at Mono Lake reminded me of walking around a giant Magic Rocks garden - very surreal indeed. The real ghost town of Bodie was very interesting; don't pass it up if you are in the area! Up to Lake Tahoe, over to Grass Valley and a tour of the Empire Gold Mine relieved part of our mine/cave spelunking cravings. Then it was on to Black Rock for the best LDRS yet.

Describing the event itself would require a separate article, and it has already been colorfully covered in past issues of *HPR*. Suffice it to say that we had a really good time and were very impressed with AeroPAC's coordination, organization and efforts, and of course all of the excellent projects and flights. Congratulations go out to everyone, albeit biased to the Florida Boys: Walter Blanca for his two stage altitude shot, and Mike Ward and Chuck Sackett for their massive undertakings and bold explorations into the extremes of power and size - redefining the boundaries of High Power Rocketry with every step. Things were going so well at this point. Perhaps that is why the Universal Counterbalance manifested itself as three flat tires. Skilled tire changers we did become!

Then on to the lava tubes at Lava Beds for more spelunking, and over the mountains to the Pacific coast for our meandering return to LA via San

Francisco. When we were approaching the Golden Gate Bridge, I made a reckless retired - geezer - in - Florida



XLR99 engine used for the X-15 at Edwards AFB. (Meyerriecks)



NASA gas station at Edwards AFB. (Meyerriecks)



Al Turner changing a flat at Black Rock Desert Nevada during LDRS. (Meyerriecks)



Magic Rocks? No, 'tufa' formations at Mono Lake, California. Dan Wilson left, Al Turner right. (Meyerlecks)



Nike site Visitor Center/Sentry building, portable radar systems. (Halsey)



Nike Ajax fueling building, with storage/shipping containers in foreground. (Halsey)



Nike Hercules on transport. (Halsey)

swerve - across - ten - lanes - of - traffic maneuver to go up to the overlook where twenty million pictures of the bridge have already been taken so that we might take just a few more. Much to our surprise (and ignorance) there are concrete fortifications there, part of Fort Barry, that overlook the bridge and bay. A perfect place for defense, but abandoned long ago. "Pretty neat," I thought as I looked over a map display. Towards the bot-tom of the map was the single word "Nike." "Can't be tennis shoes," me thinks. At that moment there was a synaptic spark between the two neur-ons that collectively may be consider-ed my brain ('ganglia' to be precise). Hmmm. Large metropolitan area. Coastal. Fort Barry. Travis AFB nearby. Cold War. It's gotta be a Nike Missile Site! Into the truck we pile, like a scene from a Three Stooges short... well, perhaps not that extreme.

At the Fort Barry Visitor Center we inquired about the Nike Site. One ranger replied "Well, it usually isn't open to the public on a weekday. But the Brass from Washington were here today on a tour, so if you're lucky and the gate is open, just go in and see if you can find 'Big Bud' - Colonel Halsey. He'll show you around if he isn't too busy." Moments later we were walking through the gate, the entrance to a real Cold War Nike missile base!

We entered the first building that

we came too; it used to be a sentry station, and there we met Colonel Milton 'Big Bud' Halsey Jr., retired now and presently the manager of this site. When he heard the ooh's and ahh's as we looked over the displays, he came out of his office and we introduced ourselves followed immediately by a barrage of questions! Colonel Halsey, "Bud," saw our keen interest in the site, and we told him of our recent excursion to Black Rock. He dropped what he was doing to entertain our questions. I mentioned that there were a lot of unanswered questions that I had concerning the grain geometry and igniter design on the Nike rocket motor. I read in one source that it was a suspended-rods-in-tube, and I heard it was a cruciform configuration from another source. He just grinned and replied "Oh, we'll get to that soon enough!"

He showed us around the building we were in, apologizing for the few stacks of unopened packages scattered about. They had just received some additional hardware and training materials and had not had the time or manpower to unpack and inventory it yet - so much to do, so little time. The site is staffed, restored, and maintained by about 45 volunteers. The National Park Service inherited the Nike Missile Site AD SF88L from the Army. This particular site was active between 1954 and 1974 and was part of eleven sites defending the San Francisco Bay area. It was abandoned by the Army and left to the elements



Serial number for a Nike Hercules payload shipping container. (Meyerriecks)



Nike Ajax fueling building (far right), assorted Hercules components and containers. (Wilson)



Hercules shipping containers, Pershing warhead container in foreground. (Meyerriecks)



Hercules solid propellant sustainer, Nike Hercules interstage adapters background. Note the exceptionally long throat! (Meyerriecks)



Cutaway "training"/display Nike Ajax. Al Turner right, Milton Halsey center, Dan Wilson left. (Meyerriecks)

for perhaps a decade. Bud explained how he got involved with the operation to restore the site and how they slowly got it to the point that we saw. Still a ways to go, but from his descriptions of its condition when the Park Service got it, they have certainly come a long way, assembling their team of volunteer experts as they went. Many of the volunteers worked on the real thing, so he has a very capable group indeed. With a practically nonexistent budget, relying greatly on donations, and very few resources they have done an outstanding job! SF88L has the distinction of being the only Cold War Nike Missile Defense site being preserved in this country. It is important for us not to forget this most important aspect of the history of our nation.

We went outside to a Launch Control Trailer (LCT) that was partially restored. Within were the original rack mounted analog computers and radar data reduction units of this mobile firing control center. Only a portion of it currently worked, but plans were in place to restore the essential parts to operational status. Bud expressed his desire to at least get the radar tracking, guidance and target acquisition and locking portion up soon so that he could acquire a real

missile lock on any smart-ass pilots that buzzed the site!

Next we headed towards a small building that had a lot of containers stacked around it. The containers turned out to be extra Nike, Ajax and Hercules fins, motor casings, interstage adapters, nose cones, etc. - even the shipping containers used for the atomic warheads on the Hercules! Bud explained how his skills in the art of requisitions-in-triplicate (you know, the "RA-slash-6-stroke-HL-dash-niner-two-stroke-J" form) paid dividends when it came to locating and securing spare missile parts from disparate warehouses throughout the country! All of us were in awe at this point, so much to see and look at.

Then we went into the building that was originally used for loading the hypergolic nitric acid oxidizer and kerosene fuel into the Ajax sustainer. My peepers bugged out of their sockets as they saw a Nike Ajax and Hercules in front of them... skin partially cut away to reveal their inner secrets! At last the answers to so many questions! Bud just grinned when he saw the excitement on our faces, and explained that these rounds were originally used for training purposes, what each of the color coded section's function was, and illuminated details and

NIKE HERCULES



The Nike Hercules (AKA MM-14, MM-14B, XSAM-A-25, Nike-J) began development in 1951 by Western Electric and became operational in 1958. It was designed to improve upon and replace the Nike Ajax and to meet the requirements for the increased threat and capabilities of enemy bombers carrying the new thermonuclear warheads.

The Nike Hercules has the distinction of firing the final US atmospheric nuclear test on November 4, 1962 at Johnston Island in the Pacific. At 2130 local time, a Nike Hercules was launched carrying a low-yield W-31 nuclear warhead, the Tightrope shot of the Dominic series. It detonated at fifteen miles altitude and two miles south-southwest of the launch point. A "flawless performance."

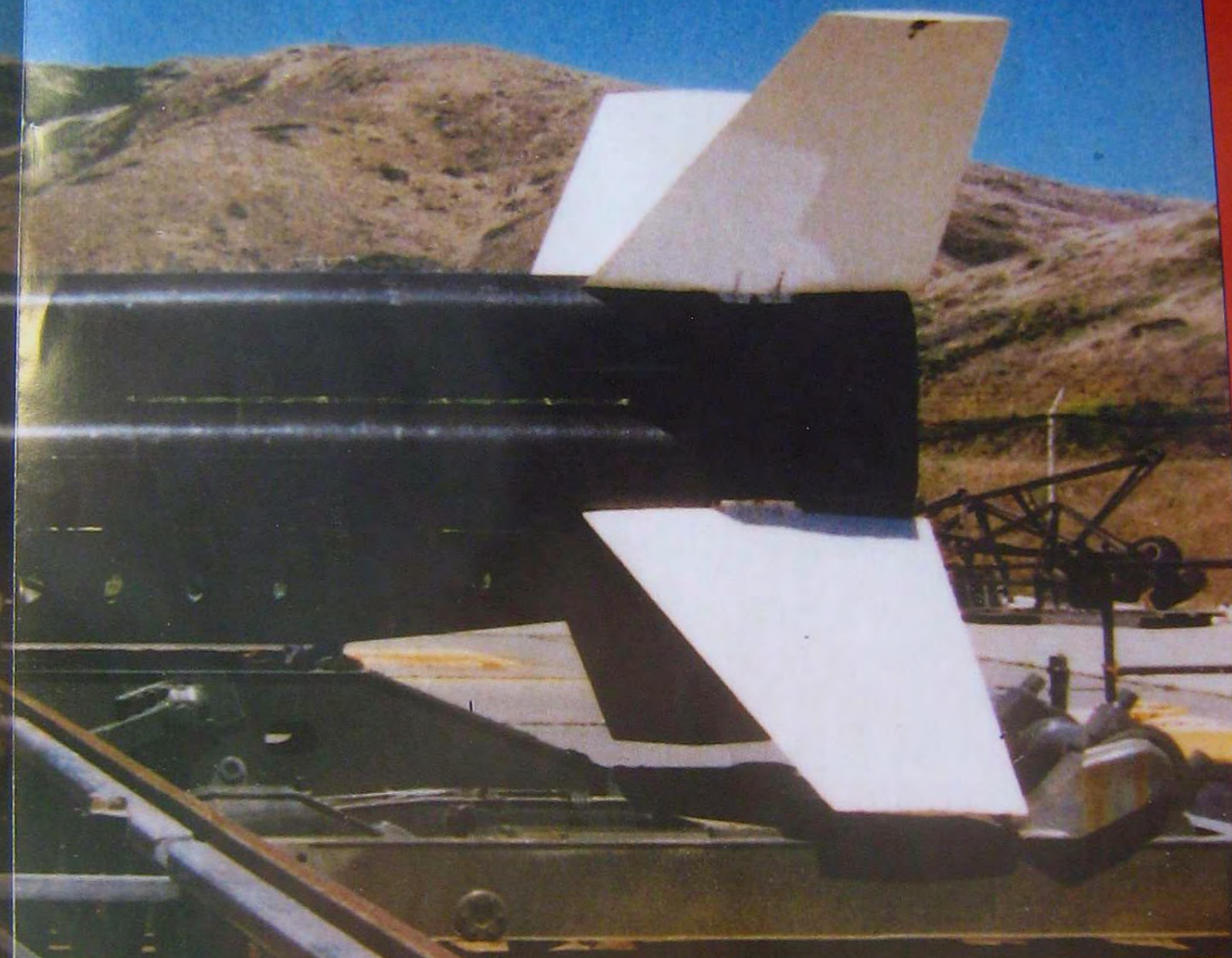
The W-31, manufactured in great number for the Nike Hercules (approximately 2550 were made between October 1958 and December 1961), could produce either 2, 20, or 40



kilotons. Descriptions of the flash of this test indicate that the highest yield (40KT) was probably used.

No Nike Hercules were ever fired from Nike Hercules bases; the only firings were for testing and training and these were conducted in Texas and New Mexico. It was phased out in the mid 1970's. The final flight of a Nike Hercules (Nike-J) in this country was performed by the Japan Air Self-Defense Force (JASDF), Commanded by Major General Hyo u Etoh, on November 18, 1992 at Fort Bliss, Texas. The JASDF fired a total of 371 Nike Hercules in training out of 500 missile firings in 30 years!

The booster employed a cluster of four Nike solid propellant motors that were cast by the Radford Arsenal. The solid propellant sustainer, manufactured by Thiokol, used a 'modern' polymeric binder/oxidizer, cast, uncooled star perforation grain for a long, relatively neutral



thrust profile. A distinguishing characteristic of this motor was the extremely long throat connecting the combustion chamber and nozzle. This served two purposes, keeping the center of gravity as far forward as possible to increase the stability of the vehicle (required for the large surface area of the fins), and so that the control actuators for guidance could surround the throat and therefore be effectively positioned for control at speeds in excess of Mach 3.

As with the Nike Ajax, most of the contractors carried out the same roles except that American Machine and Foundry replaced Consolidated Western Steel on part of the launcher contract. It carried a nuclear warhead and had a range of between 75 and 87 miles, speed of Mach 3.65. It weighed approximately 10,500 pounds, was 41.5 feet long, 2' 7" in diameter, and has a fin span of 8' 9". (Photo by Will Meyerriecks)



Ajax, from left: green guidance, yellow forward High Explosive (HE), red hypergolic tank. Hercules sustainer in background. (Wilson, Meyerriecks)

fine points that we would have missed had he not been there for the personal tour.

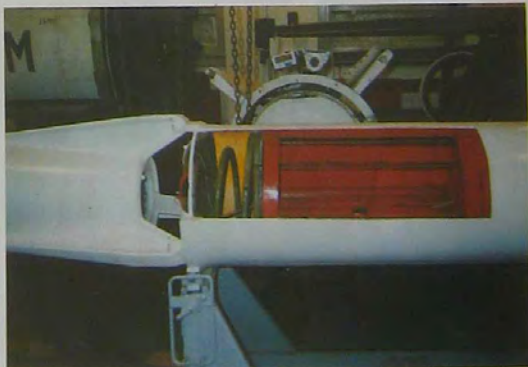
After thoroughly examining the cutaway vehicles we left the assembly/propellant loading building and walked down to a long launching rack that had a lone, emaculate Nike Hercules poised ready for elevation to the 88° firing position for ignition. Bud outlined what was involved in firing the missile; how the radar site SF88C on the top of Wolf Ridge across Rodeo Lagoon would acquire the target, the missile would be fired, and a second radar system would be used to track the launched missile and simultaneously send guidance corrections to it for intercept - thus bringing together the elements that we had seen so far on the tour. It is hard to imagine what

the thunderous roar of four Nike solid propellant motors lifting a Hercules sustainer under about 200,000 pounds of thrust would be like!

We stood around this Nike Hercules, talking about the technology that we just saw and the time when this base was active, admiring the surrounding scenery and peace that it helped to preserve. Bud asked us to each place at least one hand on the Hercules. I recalled the feelings that I had when in the presence of these great rockets at 'boneyards' like Huntsville and the Air Force museum at the Cape. I wanted to be near Nike, the Goddess of Victory, but that is a private thing. Rocket-goddess-worship in public is just a bit too nerdy! I looked at the other guys and they looked back with a kind of

quizzical expression, like "well, he did spend all that time with us on a private tour, so lets humor him then." Then the ground suddenly shook! Earthquake? No! We and the Hercules are on a giant elevator going down! We could feel the cool air rush out from the shadowy depths as we all started to uncontrollably grin. Clunk! We came to a stop, bright light stream-ing down from above as our eyes tried to adjust to the darkness. "The Pit..." Bud said. "Some call it a silo, we call it a pit." Tentative images started to form as we got off of the yellow plat-form... Here after Hercules lined up side by side on rails underground!

"I like pressing the button that brings us down here, seeing the expressions on everybody's faces and all. But I like pressing this one even



Nike Ajax: red hypergolic fuel tank, blue pressurized nitrogen tank, yellow aft HE, red combustion chamber/nozzle (in interstage). Note Ajax 'honeycomb' fin and Hercules guidance/warhead section in background in left photo. Nike front end/interstage (right). Red double-base grain held in place by forward spring. (Wilson)



Nike solid propellant grain. Note nine port extruded grain for a very neutral thrust profile, and resonance rods in each port to improve combustion stability. (Meyerriecks)

more..." Bud said with a big smile as he mashed a large red button. I was looking at Dan right when he did this and I don't think I have ever seen Dan jump as much as he did then! The claxtons sounded like World War III just started and we all jumped out of our skin! We looked up to see the exhaust plume blast doors seal us off from the surface where 30 years before, if things had been a little different... Bud chuckled as our adrenaline slowly started to drop to 500% above normal!

We checked out the Pit, inspecting all of the restored Nike Herc's that were lined up on the service rails underground. Bud told us that he could roll each Herc on its rail to the elevator, bring it to the surface, and roll it onto the firing rail, then the next, and get all of them from underground to above ground in about ten minutes - by himself! He showed us a small, emergency firing control panel that could be used to launch a vehicle if the LCT became inoperative. There were spare parts organized in various areas, crew work areas, lockers, offices, etc. just as it was 30 years before. Needless to say, it was thrilling to walk around so many restored missiles in a restored and almost operational

Pit!

Bud told us about his first visit here some ten years earlier; he and a few others had to literally wade around in swim trunks and masks because it was flooded from ground water. The time after the Army left and the Park Ser-vice acquired it was indeed a period of great neglect. After pumping out all of the water, they



Business end of a Nike Hercules. SF88A (administrative area) in background. Holding onto the Hercules warhead as we descend into the 'pit' or silo. (Meyerriecks)

spent years bringing it back to a useable condition; cleanup, sealing, rewiring, replacing rusted hardware, painting, air conditioning, etc. - an immense restoration task. They had recently finished replacing the hydraulics for the blast doors and were taking bids from contractors to replace all of the gaskets and seals on the doors - something that they wish-ed to do soon before the rains came. He said that the Nike Ajax Pit was not as far along as this Herc Pit, and that they were still having some water problems there, otherwise he would have taken us on a tour there also. Hopefully it will be nearly completely restored in a few years, depending on donations of money, materials and time.

We went back to the Sentry Post where his office is, and he showed us some Army training manuals for the Ajax and Herc, blueprints and specs for the radar systems, hundreds and hundreds of pages of the original specs that they pore over in their restoration. He also showed us a photo album packed with pictures that chronicle his team's various quests around the country to acquire spare parts and disassemble and ship Hercs and Ajaxes that are no longer wanted where located... not to worry as they will have a proper, preserved and respected home at SF88L! We thanked Bud for spending so much time with us on a personal

