

Way Back When.....

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From the White Sands Missile Range Museum Archives

This is the second in a three part series of articles about Launch Complex 38 (LC-38) formerly called Army Launch Area Five (ALA-5), detailing the way it was *Way Back When.....*

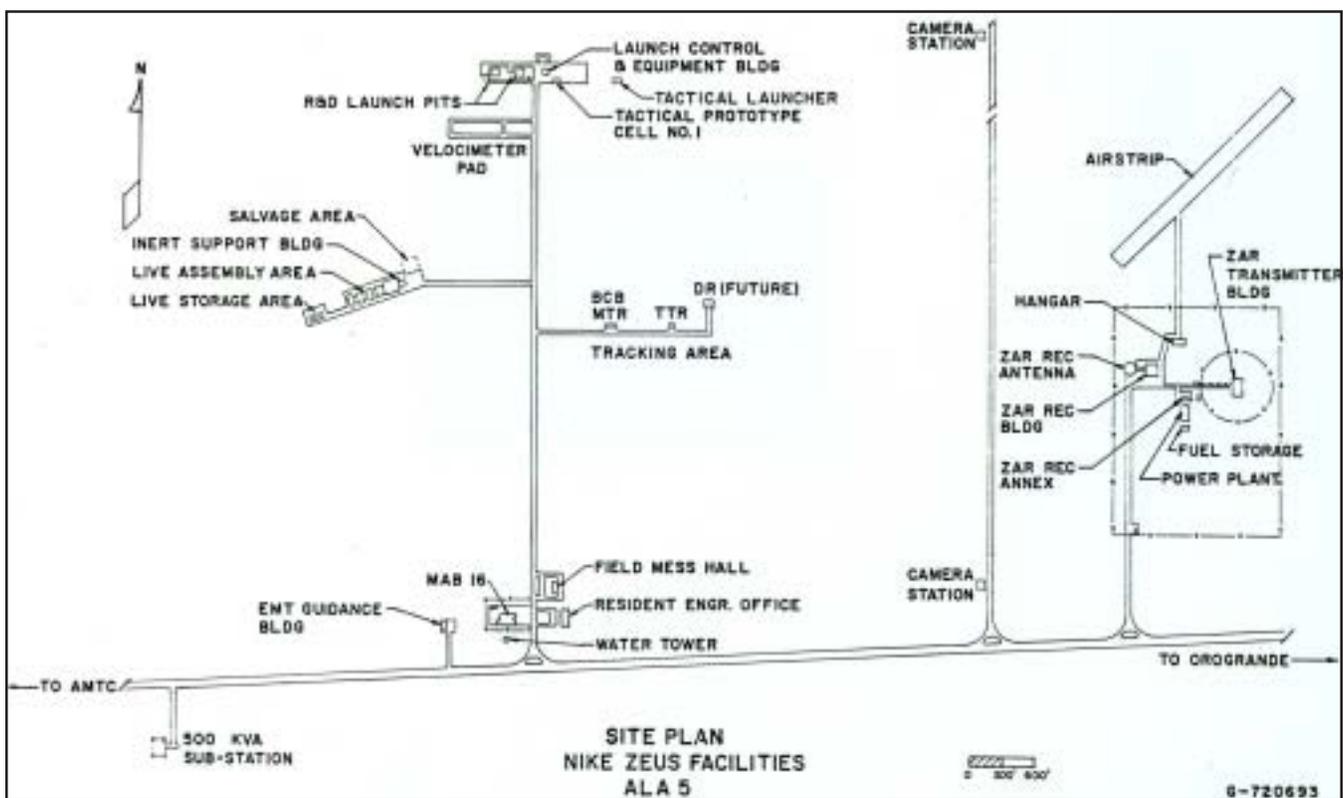
In the first article, discussion focused on the Nike Zeus Missile and Launch area. This article will cover the Nike Zeus radars.

While browsing through Archived material for information on the Zeus radars, a site plan for ALA-5 was discovered. It would have been helpful if the plan could have been included in the first article, but will still be very useful in helping to understand the layout of the Nike Zeus complex. The site plan is shown below. From the first article, you will note the water

is that the road labeled Tracking Area did not stop at the place labeled DR (Future). It angled slightly to the south then continued straight into the entrance to the ZAR Transmitter Building.

On the site plan, the radars are, from left to right, the BCB, which is the Battery Control Building collocated with the Missile Tracking Radar (MTR), the Target Tracking Radar (TTR), the Discrimination Radar (DR), the Zeus Acquisition Radar (ZAR) Receiver Antenna & Building, and the ZAR Transmitter Building.

At the top of page 2 is a photo of the BCB with the Missile Tracking Radar antenna on the tower at the left end of the building. The radar transmitter and receiver were in the building below and to the right of the antenna. As indicated above, the building also housed the Control center with a digital computer, a control room with consoles, and a viewing area behind the control room. To the left of the BCB you can



tower, MAB-16, the explosive assembly area on the left, the launch pits/cells, and the Launch Control Building. A couple items of note, which doesn't pertain to the radars are the building labeled Field Mess Hall and the Airstrip. It isn't clear who operated the Mess Hall, but LC-38 is the only Launch Complex with both a Mess Hall and an Airport. Note the Hanger and taxiway to the Airstrip. One difference from the site plan

see the white TTR antenna dome and a small portion of the ZAR receiver antenna at the lower left of the TTR dome. A note of interest is that an office building was built between the BCB and the TTR at a later date.

The photo at the bottom of page 2, taken looking north, shows the TTR on the left and the DR inside the two fences on the right.

Site preparation for the TTR began in July 1959.



Battery Control Building with the Missile Tracking Radar on the tower at left and the Target Tracking Radar dome beyond at left. Photo from the Col. (R) Daniel Duggan Collection

An interesting aspect of the TTR construction was that a temporary building was constructed on top of the radar building to shelter the installation of the radar antenna and the dome. Apparently one of the main functions of the crane built at the south end of the building was to facilitate emplacement/removal of the temporary building sections.

The TTR received information transferred from the ZAR indicating the location of a target to be placed under track. The TTR then placed the target under

track and made the precision location available to the computer and displays in the BCB and to the DR.

Site preparation for the Discrimination Radar was started in January 1961. The two fences around the DR served two purposes. One, purpose was what was commonly called a “Clutter Fence” or in some cases a “Beam Forming Fence.” In simple terms, they prevented echoes from terrain and items/structures on the ground, which were not wanted on the radar display. The second purpose was safety. You will notice the



This photo shows the Target Tracking Radar on the left and the Discrimination Radar at right.



ZAR Transmitter Building with Triangular Antenna on top inside Clutter Fence.

Photo from the Col. (R) Daniel Duggan Collection

dark strip leading from the outside fence to the left side of the DR building. This is asphalt type material covering a tunnel used as the personnel ingress and egress route for the building. Thus, the automobiles clustered at the far end of the parking lot away from the entrance. When the radar was operating, the two gates in the fences were closed. Note the bus heading east on the road at the lower right heading to the ZAR area.

To give you a little understanding of the DR and its function, one first must talk a little about an ICBM as it proceeds toward its intended target. There isn't just the re-entry vehicle (RV) or warhead coming in. There could also be multiple RVs as well. There are a lot of other things tagging along too. There will be expended stages, various parts that have been ejected or blown away as the stages separate and/or the RV is extracted from the main missile. There can also be decoys – objects made to resemble the actual RV to confuse the radars. This grouping of things are what is called a “cloud” and represents a problem for radars to sort out what is junk and what is the actual RV(s). Thus, the function of the Discrimination Radar was to take care of this task. The DR was sort of a cross between normal tracking radars, similar to the TTR, and features similar to that of array radars. By using multiple feedhorns and off-axis tracking techniques, it was able to watch and analyze all the objects in the cloud

and based upon several factors, more accurately identify the actual RV.

Site Preparations for the Zeus Acquisition Radar (ZAR), began in October 1958. The ZAR was a very unique radar. First, the transmitter and receiver were located in separate buildings with separate antennas. Second, both the transmitter and receiver antennas consisted of essentially three antennas. The transmitter transmitted in three directions at the same time. Glenn Montgomery, a retired radar technician at WSMR describes the ZAR as “The ZAR transmitted through three antennas that rotated on a common axis and were separated by 120 degrees. The ZAR receiver consisted of multiple RF receivers located on three trusses that were also separated by 120 degrees and rotated on a common axis in synchronization with the transmitter.” Glenn was one of a group of military and civil service radar technicians who were “contractor monitors” in the development and testing of the Zeus missile system at WSMR.

The ZAR transmitter building with the antenna on top is shown in the photo above left. The Transmitter was located inside a clutter fence shown in the photo. The receiver antenna and receiver building is shown in the photo below with the transmitter and clutter fence in the background. Unlike most acquisition radars of the time, the ZAR could also determine elevation, so it could pass complete location information on a target to the TTR.

So, that is a very brief look at LC-38 and the Zeus radar systems as they were during the Zeus system tests at White Sands. The next issue will deal with life at LC-38 after Zeus in our look at the way it was *Way Back When!*



ZAR Receiver Dome with Receiver Building Behind and Transmitter in background.

Photo from the Col. (R) Daniel Duggan Collection