

TITAN II ICBM by Ken Grunewald

- You are entering a small part of the dark, largely "invisible," world of the "Cold War."

- My military background:
 - Titan II missile crew commander, LRAFB, from 1974 to 1979 (had alerts in all missile sites including this one)
 - Nuclear targeting officer, Strategic Air Command (SAC) Headquarters/Joint Strategic Target Planning Staff (JSTPS), from 1980 to 1982. Worked on the Single Integrated Operational Plan (SIOP), the nation's nuclear war plan and the "football," which contained targeting info for president wherever he/she goes
 - Strategic bomber planning, B-52s, 1970s and 1980s
 - Vietnam, targeting officer, 1969-1970
 - Korea, command targeting officer, 1982-1983

- This was a Titan II Intercontinental Ballistic Missile (ICBM) complex. WHY IS IT HERE?
 - Titan II intercontinental ballistic missile part of U.S. nuclear force's TRIAD, consisting of ICBMs, Submarine Launched Ballistic Missiles (SLBMs) & manned bombers
 - ICBM silos built in interior of U.S. mainland to increase warning time from Soviet SLBMs off our coasts (first strike)
 - 7 to 10 miles apart to reduce vulnerability based on Soviet nuclear weapon capabilities at the time
 - This is 1 of 18 built for Little Rock Air Force Base (LRAFB) between January 1961 and December 1963
 - 1 of 54 built in the country at 3 bases (LRAFB, McConnell AFB, Kansas, and Davis-Monthan AFB, Arizona during the same time period)
 - This site became operational 12/18/1963
 - \$11.5 million dollars each
 - 308th Strategic Missile Wing (SMW) – 373rd and 374th Strategic Missile

Squadrons (SMS) (talk site numbers)

- Top side of complex (no launch critical equipment)
 - 600' x 600' (3 acres) fenced (7' high with barbed wire)
 - Large bump - silo
 - Smaller bump - control center
 - Access portal
 - Rectangular cement pads - fuel and oxidizer hardstands (for trailers fueling and defueling missile during periodic recycles)
 - High frequency radio antenna scar
 - Motion detectors (not visible)
 - Overhead light poles (not visible)
 - Beacon/siren pole (not visible)
 - Cooling and transformer pit (not visible)

Walk to access portal:

- This is where you entered the underground portion of the site
 - Missile crews, maintenance personnel, security personnel, visitors
 - Stairs, elevator
 - Entry procedures:
 - Remote locks
 - Closed circuit TV in entrapment area
 - Access codes
 - Elevator (for crew/maintenance gear)
 - Blast door 6 controlled by crew on duty
- Missile crew
 - 4-man/woman crew on duty at all 54 sites 24-7-365 for 25 years
 - Eight 24-hour alerts (shifts) per month plus training, testing, evaluation and extra duties
 - 4-person crew consisted of two officers—MCCC (crew commander) and DMCCC (deputy commander)—and two enlisted personnel—BMAT (ballistic missile analyst technician) and MFT (missile facilities technician)

- Each crew position required up to one year of training and evaluation before being alert-certified (Sheppard AFB, Texas; Vandenberg AFB, California; Chanute AFB, Illinois, and home base)

- Crews trained in a missile procedures trainer (MPT) on LRAFB each month—4 hours of intense emergency training (fires, leaks), trouble shooting problems, and launch procedures. Evaluated on the MPT and the launch complex once a year.

- Crew changeover:

- Total site walk-through

- Site status briefing

- Briefing on scheduled maintenance/exercises

- Side arms exchange

- Launch codes and launch keys inventory (red safe, two locks)

- The Underground:

- NOISY—fans, motors, communications gear, telephones, vibrations

- Hardened to 300 psi, due to yield and accuracy of Soviet nuclear weapons at the time. Normal atmospheric pressure is 14.6 psi. *An 8 psi blast will knock down a cement wall.

- Totally self-contained (had electrical power, water, air conditioning, air circulation, missile support equipment, security, communications, emergency rations)

- 3-level domed control center (top of dome 8' below ground, 42' tall, 37' in diameter, 18" thick concrete and steel walls with an interior steel cage suspended from top of dome on 8 springs)

- Control center was 250' (football field) from missile silo. It was separated by a blast lock, two 3-ton blast doors, and short and long cableways.

- Missile silo - 147' deep and 55' diameter

- Work platforms for maintenance and servicing missile

- Capped by 740-ton silo closure door, retracted for launch

- Silo surrounded by 9-level equipment area (tube within a tube)

- Contained equipment required to maintain the missile in readiness

condition and complex support equipment

- Ladders to all nine levels

- Elevator to levels 2 - 8

- Blast deflectors (called the "W") and 100,000-gallon water tank for in-silo launch. Unlike Atlas and Titan I, the Titan II had a hot launch.

- Titan II missile in silo

- Sitting on a 26,000-pound thrust mount supported by springs (basically everything was on springs)

- Silo kept at constant 60 degrees F to keep propellants stable (oxidizer would boil or turn to jelly if too hot/cold)

- Titan II missile (LGM-25C)

- Biggest ICBM U.S. ever built (built by Martin Marietta, Denver)

- Remained fueled in silo and launched from silo (hot launch) unlike predecessors Atlas and Titan I - provided quick response and reduced vulnerability

- Replaced Atlas and Titan I, which had to be raised and fueled before launch (10 minutes to fuel) Khrushchev on California visit in 50s with Eisenhower

- Soviet Union was terrified of it because of big warhead it carried (high priority first strike target)

- 103' tall, 10' diameter

- Two-stage plus reentry vehicle (RV)

- Stage 1 430,000 lbs thrust (equivalent to two 747s)

- Stage 2 100,000 lbs thrust

- Hypergolic propellants - fuel and oxidizer combusted on contact (could be stored in missile airframe indefinitely)

- Fuel - Aerozine 50 (unsymmetrical dimethyl hydrazine)

- Oxidizer - nitrogen tetroxide (classified a "Poison A," the most poisonous of manmade chemicals)

- 6,000 mile range

- 8,200 pound throw weight

- Airframe made of anodized aluminum the thickness of a dime in places

and a quarter in other places, self-supporting

--- Basically a flying fuel tank - propellant weighed 340,000 pounds, while the airframe and RV were 23,000 pounds combined

--- Cost \$2.5 million dollars to build in early 1960s

--- W53 warhead in a Mark 6 RV

---- 9-megaton yield (9 million tons of TNT)

----- Biggest deployed U.S. warhead (USSR had 18 - 24 megatons most common; also Big Ivan - 150 megatons)

----- 9 megatons is 600 times more powerful than the 15 kiloton Hiroshima bomb (Little Boy) (15,000 pounds TNT)

----- More explosive power than all bombs dropped in all previous wars combined

----- Suborbital with 800 mile max altitude

----- Launched over Arctic

----- Less than 1 mile circular error probable (CEP) accuracy

(same as USSR)

----- Used for large soft targets (i.e. submarine pens, naval bases (air burst) or hardened underground complexes such as command centers (ground burst))

-- Titan II also used to launch NASA's 2-person Gemini capsules (1962 - 1966) - 10 manned missions (Armstrong, Grissom, Cooper, etc.) and several satellite launches for NASA and the military

- Communications/Emergency Action Messages - (EAMs) How/when do you launch this thing?

-- National Command Authority (the president) transmitted EAMs to the nuclear forces in coded format via:

--- Primary Alerting System (PAS) - land line (noisy!)

--- High Frequency radio (HF)

--- Ultra High Frequency radio (UHF)

--- Two hardened transmission systems - transmitted through the earth

-- EAMs used for:

- Defense Condition (DEFCON) changes (V - I) (SAC normally in DEFCON IV)
 - Launch messages (Red Dot)
- Crew reaction to Red Dot EAM
 - MCCC and DMCCC verify validity of message (BMAT and MFT look over shoulder)
 - MCCC and DMCCC remove their respective locks from red safe
 - Remove codes and keys from safe
 - MCCC and DMCCC check and verify codes
 - Insert respective keys in MCCC and DMCCC consoles
 - Verify launch time (key turn time; critical)
 - Insert decrypted codes into Butterfly Valve Lock Control (BVLC) received in EAM (to prevent unauthorized launch and unlock valve on stage 1 engine oxidizer line)
 - Run launch checklist from Dash One (basically the missile operations manual and the crew's bible)
 - MCCC and DMCCC turn keys simultaneously at determined launch time
 - Begin trouble shooting procedures if "hold" occurs
 - Fix problem using technical manuals
 - MCCC and DMCCC compute new launch timing
 - Reattempt launch with simultaneous key turn at new time (call wife and cancel dinner date)
- The accident - Why We Are At This Particular Site
 - Missile had just recently been recycled (explain)
 - Low pressure stage 2 oxidizer tank indicator lit on console
 - Not unusual after a recycle - usually needed several nitrogen repressurizations to stabilize
 - 6-person Propellant Transfer Team (PTS) dispatched 9/18/1980 to perform this routine maintenance. Arrived about 3 p.m. and had to wear Rocket Fuel Handler's Clothing Outfit (RFHCO) - 85 lbs with oxygen pack (moon suit).
 - PTS team had been working at other sites all day - already tired

- Expected quick fix and go home
- Found required work platform on level 2 would not extend - crew called maintenance
- No parts - had to be choppered from base
- Platform operational sometime after 6 p.m.
- Sr. Airman Powell (21 yrs old, 3 yrs experience), and Airman Plumb (19 yrs old, rookie), enter launch duct in RFHCO at 6:30 p.m., tired after having already worked 10 hours that day
- Forgot to bring correct 20 lb wrench from truck - did not go back to get it - used substitute unauthorized wrench in silo being used as a door stop
- During procedure, 9 lb socket came off wrench, fell between platform and missile, and dropped 70 feet down into silo
- Socket bounced off the thrust mount supporting the missile, hitting and puncturing the stage 1 fuel tank of the missile (OOPS!)
- Fuel started gushing out like a garden hose

- Crew/PTS actions
 - Emergency klaxon sounds in control center
 - Multiple alarm lights start flashing on the Launch Control Console (LCC) - combination of alarms doesn't make sense - oxidizer pressures, fuel pressures, fire indications all simultaneously
 - Alarms would not reset after multiple attempts
 - No emergency checklist in Dash One for combination of flashing lights being displayed
 - PTS team in silo did not immediately tell crew what had happened - just said they "see a white cloud in the silo"
 - Crew instructs PTS team to return to the control center

- Emergency teams activate
 - PTS team tells crew what actually happened
 - Crew calls LRAFB wing command post who notifies wing commander
 - Wing commander activates the Missile Potential Hazard Team (MPHT)

- LRAFB command post notifies SAC command post, which activates SAC's MPHT
- LRAFB wing commander orders crew to evacuate control center on directions from SAC (POSSIBLY COST LIFE)
 - Crew evacuates through emergency escape portal on level 3 of control center
 - Wing commander calls Sgt. Jeff Kennedy at home (most knowledgeable person about missile on base) and tells him to report to the base (they don't like each other--Kennedy a no nonsense guy)
 - Kennedy and wing commander chopper out to missile site
 - Emergency vehicles, ambulances, press start congregating at site along Hwy. 65
 - Kennedy "sneaks" into control center in violation of "two man policy" through emergency portal to check tank pressures on LCC
 - Stage 1 fuel pressures going down rapidly; ox tank pressures going up rapidly (heat caused by water and fuel in launch duct due to sprays automatically coming on for fire indication)
- Communications
 - LRAFB to SAC
 - SAC to Ogden Depot, Martin Marietta, 8th Air Force at Barksdale AFB
 - All trying to develop a checklist to address this unprecedented emergency situation - MUCH confusion and delays
 - Martin Marietta says "do nothing"
 - Kennedy says "open silo door to vent"
 - All others scrambling
 - Vice Commander and Chief of SAC (CINCSAC; three-star general) takes charge. CINCSAC is away from site and has no missile experience.
 - No one is to do anything without his personal approval
 - Causes delays and hesitancy
 - Kennedy is furious since this is a very fluid situation requiring quick, innovative, educated actions - not delays.
- Proposed solutions

-- Kennedy:

--- Enter complex via emergency portal

--- Open silo closure door to vent

--- Lower work platforms to keep missile from collapsing on itself

* talk pressures (Ox going up - will burst tank; fuel going down - will cause missile to collapse - air in tire analogy)

-- Martin - do nothing - let it run its course

-- SAC - still thinking

- Final actions

-- With SAC approval, LR MPHT tells PTS team to enter complex to check vapor levels and tank pressures

-- Told to back out if vapor levels above 250 ppm

-- Kennedy and Sr. Airman David Livingston (from relief PTS team) volunteer

-- Kennedy livid - told to enter through access portal instead of emergency portal (POSSIBLY COST LIFE)

-- Have to break through locked doors in access portal and hand pump through blast doors - more delays - more hazardous

-- Encounter "off the chart" vapor levels and back out

-- Kennedy sitting on access portal ramp topside

-- As Livingston is coming up behind him, he turns on the access portal exhaust fan (says he was told to over headset, but Kennedy told him not to) (POSSIBLY COST LIFE)

-- Seconds later, the missile explodes at about 3 a.m. Sept. 19, 1980 - about ten hours after the wrench was dropped

- Aftermath

-- Jeff Kennedy thrown 150' SW against silo fence - seriously hurt but conscious

--- Crawls to a truck outside the fence

--- Hears Livingston call for help but is too injured to help

-- Livingston found and carried out after more than an hour lying on ground without his helmet, inhaling oxidizer fumes

- Silo closure door blown 750' northwest
 - Warhead blown 200' east into a ditch by the access road
 - Control center basically intact - MCCC's coke can still on LCC
 - After many delays, Kennedy and Livingston evacuated from Complex 4-5 (about 15 miles south on Hwy. 65) by AF helicopter at 5 a.m.
 - Taken to Baptist Hospital intensive care
 - Sr. Airman Livingston dies at Baptist on Sept. 20, 1980 at 22 yrs old - pulmonary edema (dry drowning)
 - Warhead is located immediately - dismantled and removed from site after three days and taken to storage facility in Texas (no radioactivity detected)
 - Kennedy gets out of AF and returns to Maine - dies in 2011 at 56 (25 at time of accident)
 - SAC accident report tries to protect image of Titan and places much blame on lower ranking people. However, it did cite many safety issues with the missile complex and emergency equipment.
 - Wing commander reassigned to dead end job
 - No one at SAC fired or reprimanded
 - Powell receives Article 15 - severe reprimand
 - Kennedy initially reprimanded, then awarded Airman's Medal (highest peacetime AF medal)
 - CNN did its first big "Breaking News" story on the Titan II accident at Damascus.
- Titan II deactivation
- When built, Titan II was scheduled to be retired in 1971 (about 9 - 10 year life span)
 - Secretary of Defense McNamara (Sec. of Def. under Kennedy and Johnson) wanted it retired in mid-60s - was scared to death of it
 - Deactivation had nothing to do with the SALT Treaty - decision was totally based on safety, cost, and aging technology
 - After the accident, Secretary of Defense Casper Weinberger (under Reagan) called for its retirement in 1981

- Dismantlement of missile complexes began in 1982
- Dismantlement involved:
 - Removing and dismantling warhead and transporting it for storage in TX
 - Defueling and removing the missile and transporting it for storage/dismantlement in CA and AZ - 12 kept for satellite launches
 - Removing salvageable equipment from the equipment areas and control center
 - Sealing off all access to underground
 - Blowing up the top 30 feet of the silo and filling it in with sand and debris while Soviet satellites were overhead
 - Dismantlements took place from 1982 to May 1987
 - Order of wing deactivation was Davis-Monthan first, then McConnell, then Little Rock
 - Last Titan II missile on alert was 373-8 at Judsonia - off alert May 5, 1987 (LRAFB's alternate command post)
- Now
 - One missile left in Titan II museum near Tuscon, AZ (unlaunchable)
 - Museum was one of Davis-Monthan AFB's 18 active sites - purposely saved as a museum
- Further information:
 - *Titan II, A History of a Cold War Missile Program* by David K. Stumpf
 - *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety* by Eric Schlosser (2013 Pulitzer Prize Finalist; presented at Clinton Library)
 - *The Titan II Handbook: A Civilian's Guide to the Most Powerful ICBM America Ever Built* by Chuck Penson
 - Jacksonville Museum of Military History
 - Much information on the web