**Cheyenne Mountain nuclear bunker**

From Wikipedia, the free encyclopedia

*"Cheyenne Mountain" redirects here. For other namesakes of the landform, see Cheyenne Mountain (disambiguation).*

|  |
| --- |
| **Cheyenne Mountain nuclear bunker** |
| *colloq.* Cheyenne Mountain, NORAD cave, NORAD, etc.  |
| Part ofNorth American Aerospace Defense CommandNational Operational Intelligence Watch Officer's NetworkIntegrated Tactical Warning/Attack Assessment Program |
| Located at ­Cheyenne Mountain AFS, El Paso County, Colorado |
| Beyond the parking area excavation (right of center) through the bunker's North tunnel entrance (at point of triangular-shaped excavation), the bunker's Access Tunnel extends to the South opening at the end of an access road (diagonally toward left). The bunker has an Exhaust outlet (right, mid-slope), and NORAD Road (left-to-right) has a CO 115 interchange (not shown) on the west side of Fort Carson. The foreground is now a southern subdivision of Colorado Springs, Colorado, (minor peak over main chambers and southeast of Robber's Roost). |
| **Built** | May 18, 1961–February 8, 1966 |
| **In use** | 1966–2006 (command center) |
| **Controlled by** | 2006: Cheyenne Mountain Divisionc. 2001: Cheyenne Mountain Directoratec. 1995: USSPACECOM Cheyenne Mountain operations center1994: Joint Task Force — Cheyenne Mountain Operations1981: Aerospace Defense Center1966: North American Aerospace Defense Command1961: Army Corps of Engineers (Omaha District)The bunker includes an• **Access Tunnel** (right) with North and South openings at the massif's east slope,• **side tunnels** to the main chambers and the support area, • a **support area** including reservoirs (blue), and• **main chambers** (gray grid) for the centers (dark green buildings are 3 story) with 3 tunnels 45 feet (15 m) wide, 60.5 feet (20 m) high, and 588 feet (180 m) long intersected by 4 cross tunnels 32 feet (10 m) wide, 56 feet (17 m) high and 335 feet (100 m) long.  |

The **Cheyenne Mountain nuclear bunker** is a Cold War hardened installation with NORAD centers and associated computer systems in warm standby such as the Alternate Command Center for the nearby Peterson AFB NORAD-NORTHCOM Command Center. Built after more than 11 previous US command bunkers (e.g., 1953 Raven Rock & 1960 Ft MacArthur DC), Cheyenne Mountain was designed for a 30 megaton nuclear explosion within 1.0 nm (1.2 mi; 1.9 km). The bunker is 5.1 acres (2.1 ha) tunneled within part of a spur of the Cheyenne Mountain massif at the Rocky Mountains' eastern "Front Range". The bunker's standby centers are controlled by a NORAD division,and support services are provided by Air Force Space Command's 721st Mission Support Group.



The bunker's Command Center was upgraded 2003-4 for $13 million.



The exterior North Portal protects the eastward tunnel opening. The south opening of 17.5 ft high (5.3 m) x 15 ft wide (4.6 m) has a concrete abutment.



The 25-ton North blast door is the main entrance to another blast door (background) beyond which the side tunnel branches into access tunnels to the main chambers.

**Description**

The bunker includes the renovated Missile Warning Center and prior to the 2006-8 realignment, operations were "conducted at five major centers…the Command Center, Air Warning, Missile Correlation, Operations Intelligence Watch, and Space Control—by approximately 658 people, including support personnel." The Weather Support Unit was a major center, and the Unified Space Vault and the Space Control Center were moved "from Cheyenne Mountain to the Joint Space Operations Center at Vandenberg AFB".

**Main chambers**

The main chambers are a 4.5-acre (1.8 ha) rectangular grid with buildings that stand free of the rock, are joined by flexible vestibule connections, and are supported by 1,380 steel springs (937 under the original 11 buildings) for earthquakes or NUDET ground shocks. The springs are ~1,000 lb (450 kg) each and support the buildings' structural steel frames that hold the building shells of ⅜ inch (9.5 mm) continuously welded low carbon steel plates, which along with connecting passages provide EMP shielding. Services include a cafeteria, medical/dental facility, a two-bed ward, pharmacy, a small base exchange, barber shop, and physical fitness center (cf. "outside, the TSF").

At the tunnel B and tunnel 2 command center chamber (intersection B-2), a shear zone within the overhead granite is supported by a dome ("concrete sphere") of 98 ft (30 m) diameter over the "Center Buildings". The bunker also uses 115,000 bolts extending 6.6–30 ft (2.0–9.1 m) into the overhead granite and torqued for 40 kg/m2 to prevent fracturing. Netting is used to stop falling rock, and drainage is provided to channel water dripping from the rock.

**Access Tunnel**

The Access Tunnel (colloq. "blast tunnel") of 4,700 ft (1,400 m) includes a curved North Access Tunnel of 1,416 ft (432 m) "for use by personnel and vehicles" that is 29 ft × 22.5 ft high (8.8 m × 6.9 m), a South Access Tunnel with a slight curve, and the connecting straight Central Access Tunnel. The tunnel with blast doors closed after a "button-up period" can withstand a nuclear explosion causing up to 600 psi (4,100 kPa) overpressure at the exterior surface of the mountain (e.g., blast valves automatically close). A short turnaround tunnel near the North blast door provides a larger area for shuttle buses to reverse direction from/to the exterior parking lots—the original 412 car lot is on 470,000 cu yd (360,000 m3) of granite fill "dumped in a canyon".

**Support area**

The support area stores 500,000 US gal (1,900,000 l) of diesel at the bunker's lowest excavated level four banks of batteries and six 1,750 KW diesel generators to back up Colorado Springs Utilities electricity into the bunker. The 4 water reservoirs (1 for freshwater) hold 1,800,000 US gal (6,800,000 l) drinking water and over 5,300,000 US gal (20,000,000 l) "industrial water". Incoming air mainly through blast valves in the South Access Tunnel may be filtered to remove chemical, biological, radiological, and nuclear pathogens/particles.

**History**

United States defense plans in 1945 and 1947 "recommended moving ADC Headquarters from Mitchel Field [New York] to a more central location…in a protected command center … designed to withstand attack by all foreseeable weapons" (e.g., "German A-4 type" missiles). The subsequent concrete block command post at Ent AFB, Colorado, was completed in May 1954 and supported October 1953's "The New Look" strategy: "to minimize the [Soviet] threat","the major purpose of air defense was not to shoot down enemy bombers--it was to allow SAC" bombers "to get into the air [and] not be destroyed on the ground [to allow] massive retaliation". In December 1956 the CONAD commander requested a bunker to replace the above-ground Ent blockhouse, and the 1957 Gaither Commission identified "little likelihood of SAC's bombers surviving since there was no way to detect an incoming attack until the first [ICBM] warhead landed". In the 1950s American Telephone and Telegraph "hardened many of its switching centers, putting them in deep underground bunkers", and in 1959 Canada's NORAD bunker was begun.

On February 11, 1959, the JCS approved the US bunker project and assigned development to the USAF which selected the "NORAD cave" site based on RAND's recommendation. JCS site approval was March 18, 1959, and the firm of Parsons, Brinkerhoff, Hall, and MacDonald was contracted for the design. Following an August 1959 Nike ABM interception of a test missile, the mission was expanded to "a hardened center from which CINCNORAD would supervise and direct operations against space attack as well as air attack" (NORAD assumed "operational control of all space assets with the formation of" SPADATS in October 1960.) After DoD cut back of planned SAGE "Super Combat Centers" (SCCs) with underground solid state computers in 195 a presidential committee cancelled all SCCs in February 1960. In 1963, the NORAD command center operations were moved from Ent AFB to the Chidlaw Building's partially underground Combined Operations Center ("war room").

**Construction**

On May 2, 1961, "for the excavation work of the granite mountain", Utah Construction & Mining was selected from 13 bidders for the ~$6 million mining contract. Excavation for roads and a base camp began May 18, 1961; blasting began May 25; tunneling from the South began June 20 (North on July 10); and the 2 tunnel excavations had met by November 16. Colorado School of Mines' Dr Livingston designated precision blasting to prevent later fracture of remaining granite and on December 21, 1961, with excavation 53% complete there were 200 workers on a wildcat strike.

On February 21, 1963, for "NORAD Phase II Facilities" ($6,969,000 plus $106,000 additional funds) Continental Consolidated was contracted for interior construction that began in March and included clearing the water reservoirs and erecting 11 buildings with 170,000 sq. ft (3.9 acres) of space: 8 three-story buildings in the "main chambers" and 3 two-story buildings in the support area. On June 5, 1963, visiting President Kennedy was briefed on the bunker's status (his chair is at the Peterson Air and Space Museum.) Grafe-Wallace, Inc and J. M. Foster Co. received "a joint $7,212,033 contract for installation of utilities and blast-control equipment in April 1964" (e.g., the original six 956-KW diesel powered generators). Burroughs had the $40 million prime contract for the electronics which included an $800,000 camera/projector system for 13 ft × 16 ft (4.0 m × 4.9 m) images from the custom-built RCA Display Information Processor.

On May 1, 1964, "excavations for the hardened COC" ended, and the main chambers B-2 dome was completed in May. The "NORAD/CONAD Combat Operations Center" was ready for initial manning on May 18, 1964 (NORAD began manning the COC on October 30.) On January 20, 1965, the Cheyenne Mountain Complex was renamed to "NORAD Cheyenne Mountain Complex" (NCMC) and on May 7, "the first piece of major equipment, a Philco 212 Computer, had been placed in the NORAD Combat Operations Center" (NCOC) for the 425L system. In June, 3 buildings began occupancy ("South Center Building" on the 11th, "North Center Building": 17th, "Center Building": 28th), basic testing was satisfactory on December 15, and all 11 underground buildings were complete in December. In 1966, the Electronic Systems Division (ESD) turned the bunker's COC over to NORAD on January 1, the NCMC was accepted on February 8, and a 3rd Philco 212 became operational on March 31 for the bunker's 496L system. The Chidlaw ***Combined* Operations Center** mission transferred to the bunker on April 20 when the 425L system became operational, the NORAD Attack Warning System (NAWS) became operational on May 20, and Cheyenne Mountain systems became"the nucleus of the worldwide Integrated Tactical Warning and Attack Assessment (ITW/AA) system".

On July 1, 1966, full operational capability (FOC) of the COC (425L "Command/Control and Missile Warning system") was achieved, integrating data from other "Big L" systems: "*the Intelligence Data Handling System, the Ballistic Missile Early Warning System, Defense Communications Agency's Continental United States network* [e.g., from 8 416L AN/FSQ-8s] *and the* [Ent AFB] *Space Defense Center*". "Blast-resistant" communication with the DCA network (800 military installations) was originally via Cheyenne Mountain's 2 radio data links and 4 ground lines of the Close-in Automatic Route Restoral System (CARRS). CARRS nodes included the Black Forest Microwave Station of AT&T to the northeast and the Lamar Communications Facility east-southeast (initially of the 47th Communications Group). The Aviano Air Base correlation center for the Forward Scatter over the Horizon Radar network (440L system with AN/FRT-80 transmitters & AN/FSQ-76 receivers) wasalso connected to the NORAD Combat Operation Center. By January 4, 1967, the Civil Defense National Warning Center was in the bunker for transmitting to public broadcasting stations.

For the **Group III Space Defense Center** (496L System following the earlier 496L sites at Hanscom Field & then Ent), the ~$5 million Delta I computer system became operational at the bunker on October 28, 1966, "adjacent to the NORAD command center" (on February 6, 1967, the 1st Aero's SDC operations moved from Ent AFB to the bunker.) The Ballistic Missile Defense Centre authorized in April 1970 and installed in January 1974 "collocated with the…Combat Operations Center" was "the highest echelon of command in the SAFEGUARD System" for the LIM-49 Spartan ABM.

**Improvements**

*For false attack warnings generated by the Mount Hebo radar site and by this facility (e.g., 1971 CONELRAD "scare"), see NORAD false alarms.*

NORAD's **Information Processing Improvement Program** (ESD program 427M contracted in 1972, operational in 1979) was for 3 "major segments" at Cheyenne mountain: the Communication System Segment (CSS), NORAD Computer System (NCS, replacing the 425L system), and Space Computational Center (SCC, replacing the SDC 496L system). On January 19, 1973, "System Development Corporation was awarded a $15,850,542 contract to update satellite information processing" (a 2nd phase was mainly for SCC software/displays.) In 1977 to replace the original UNIVAC 1106 of the "Command Center Processing system", HQ USAF approved the acquisition of a UNIVAC 1100/42 for the Command and Control Processing and Display System (CCPDS) By 1978, the NORAD Combat Operations Center was "composed of a command post and five operating centers": Battle Staff Support Center, Weather Support Unit, Intelligence Center, System Center (consolidating all data to the Command Center), and Space Computational Center. In 1979 the Space Defense Operations Center (SPADOC) was established in the NCMC for command and control of the SSN (the 1985 SPADOC backup was at Eglin AFB), and on July 11, Presidential candidate Ronald Reagan visited Cheyenne Mountain. In 1981 the SCC and the System Center each had 2 H6080 computers.

Under the Strategic Defense Architecture (SDA-2000), on December 23, 1980, after a November NCS "exhaustive test” the USAF declared FOC for the 1st 7 JSS ROCCs providing aircraft tracks to Cheyenne Mountain. By 1981 Cheyenne Mountain was providing 6,700 messages per hour compiled via sensor inputs from the JSS, BMEWS (474L system), the SLBM "Detection and Warning System, COBRA DANE, and PARCS as well as SEWS and PAVE PAWS" for transmission to the NCA (Pentagon's NMCC, Raven Rock's ANMCC, and SAC's Offutt/Notch command posts). The Air Defense Operations Center (ADOC) began an upgrade in 1986, the Survivable Communications Integration System (SCIS) development was approved in 1986, and GTE was the 1988 contractor for a $281 million computer communication improvement (switchover to generators took too long). In 1988 for coordinating the SSN, development of the bunker's Space Surveillance Center (SSC) was approved.

The **Cheyenne Mountain Upgrade** (CMU) of November 1988 consolidated 5 improvement programs for $968 million that had been delayed beyond the planned completion in 1987: CCPDS Replacement (CCPDS-R), CSS Replacement (CSS-R), Granite Sentry upgrade, SCIS, & SPADOC 4. SPADOC 4 was for upgrading the SCC with primary & backup 3090-200J mainframes), and SPADOC 4 block A achieved IOC in April 1989. The CSS-R "first element" achieved IOC on April 12, 1991; and the 427M system was replaced c. 1992. The CSSR, SCIS, Granite Sentry, CCPDS-R, and their interfaces were tested in 1997 (Granite Sentry NUDET data processing was "not adequate").

By 1992, the U.S. Space Command Space Surveillance Center (SSC) was the "data analysis and tracking center" for Baker-Nunn camera images and Cheyenne Mountain was connected to the GWEN communication site toward Pueblo, Colorado. By 1995 the HAVE STARE radar had been upgraded to "relay data to Cheyenne Mountain", and by October 1995 the 1CACS in the bunkerwas providing Space collision avoidance data to the "Cheyenne Mountain Operations Center's space control center". In June 1993, the "Cheyenne Mountain Complex Operations Center" included the "USSPACE and NORAD Command Center", "NORAD Air Defense Operations Center (ADOC)", "NORAD/USSPACECOM Combined Intelligence Watch Center (CIWC)", "USSPACECOM Space Defense Operations Center (SPADOC)", "USSPACECOM Space Surveillance Center (SSC)", "AFSPACECOM Weather Operations Center", and "AFSPACECOM Systems Center". By July 1994, an initiative had begun to "collocate the USSPACECOM and NORAD command centers", and in February 1995, the "missile warning center at Cheyenne Mountain AS [was] undergoing a $450 million upgrade program as part of Cheyenne Mountain's $1.7 billion renovation package".

The **Combatant Commander’s Integrated Command and Control System** (CCIC2S) program began in 2000 with a Lockheed Martin contract "to upgrade all of the mission systems within Cheyenne Mountain, which included the space surveillance systems" for delivery in 2006. The portion of CCIC2S modernizing "attack warning systems within Cheyenne Mountain [was to] cost more than $700 million from fiscal years 2000 to 2006", and the delayed CCIC2S upgrades for space surveillance were supersededby systems for the Joint Space Operations Center's Space C2 program and Integrated Space Situational Awareness program. By 2003, consoles for the Ground-Based Mid-Course Defense (GMD) had been contracted for Cheyenne Mountain, and the planned 18 month Cheyenne Mountain Realignment to move Command Center operations to Peterson AFB[77] was complete by May 13, 2008. On August 3, 2011, a ribbon cutting was held for the January 2010-June 30, 2011, Missile Warning Center renovation funded by USSTRATCOM.

**Units**

Electronic Systems Division Detachment 10 at Ent AFB became the **Cheyenne Mountain Complex Management Office** (CMCMO) in 1963, the year the Chidlaw Combined Operations Center began operations; and on February 15, 1980, ESD Detachment 2 was established at the "Cheyenne Mountain complex" (Det 2 became the AFSC focal point during the Cheyenne Mountain Upgrade.) Aerospace Defense Command organizations in the bunker became a specified command when the major command ended in 1980; e.g., the J31 unit of HQ NORAD/ADCOM subsequently manned the Space Surveillance Center in the same room as the Missile Warning Center (separated by partitions).The "HQ Cheyenne Mountain Support Group…was activated at the Cheyenne Mountain Complex" in October 1981 to support the Aerospace Defense Center's operation of the NORAD combat operations center". In 1983 the Foreign Technology Division had an operating location at the bunker and in 1992, an airman of the "1010th Civil Engineering Squadron at Cheyenne Mountain AFB" developed a 3-D AUTOCADD model of the bunker "to zoom in on a specific room".

By 1995 a "missile operations section" supported the missile warning center, and in 2001 the 1989 1CACS at Cheyenne Mountain AFS was renamed the 1st Space Control Squadron. On June 24, 1994, when the "**Joint Task Force — Cheyenne Mountain Operations** organization was brought online to take responsibility for the installation", Brig. Gen. Donald Peterson was the commander of the JTF, which was renamed the "U.S. Space Command Cheyenne Mountain operations center" by March 1995 (the unit had an exercise branch in June 1996). On July 28, 2006, the Cheyenne Mountain Realignment re-designated the Cheyenne Mountain Directorate to the Cheyenne Mountain Division. Circa 2004 the bunker included the 17th Test Squadron's Detachment 2 and AFTAC's research laboratory, in 2008 Detachment 1 of the 392nd Training Squadron operated the Cheyenne Mountain Training System (CMTS), and in 2011 the installation's 721st SFS was expanded.