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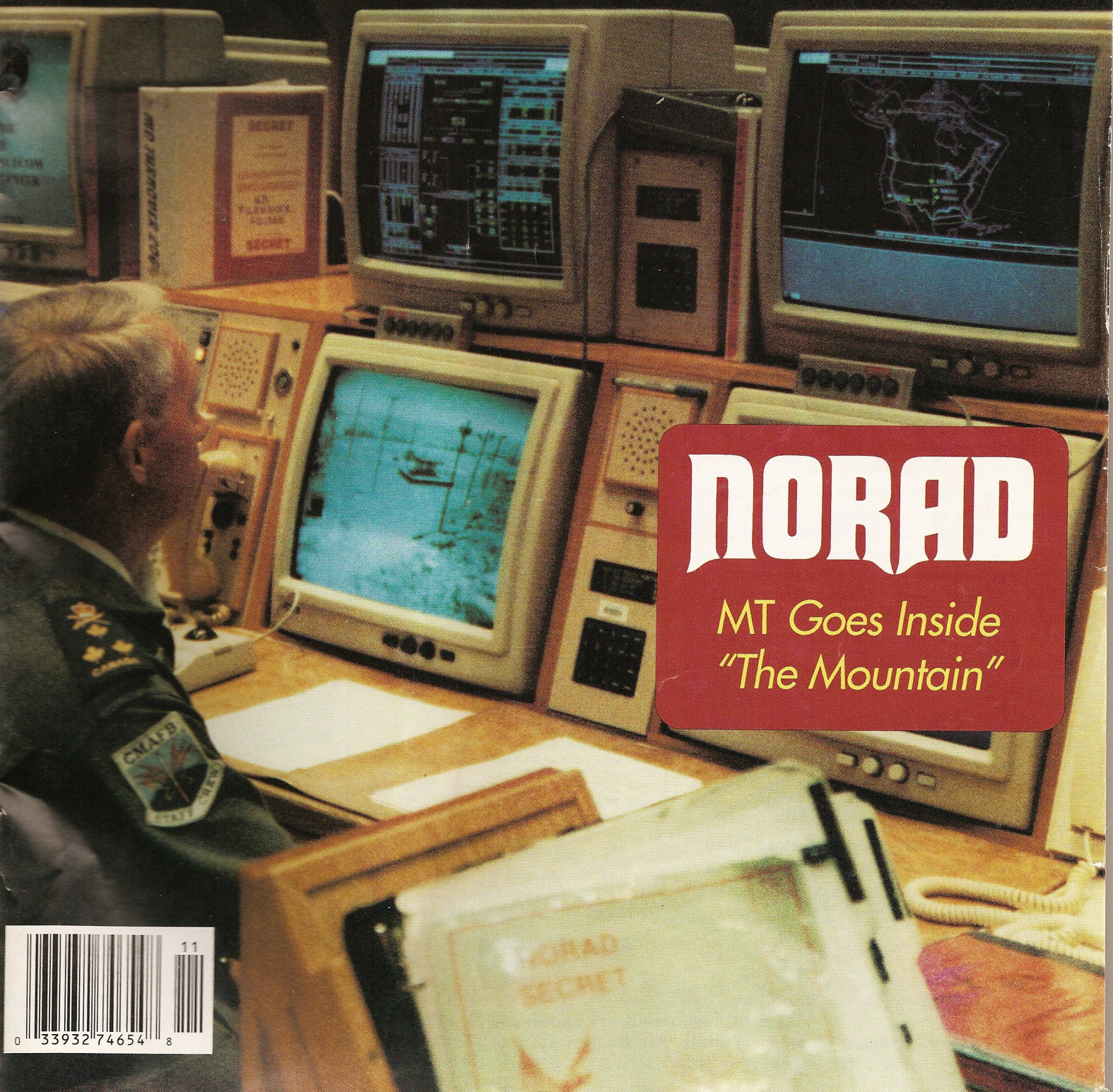

NORAD

MT Goes Inside "The Mountain"

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MT *Takes a Look Inside Cheyenne Mountain*

Photo by Harry Baughn

By Larry Van Horn

Nothing seemed out of the ordinary. It was just another day at the office. A tour group was in the command center briefing room with their Air Force military escort. They were being briefed on how NORAD performs their mission. Just in front of them was a large glass window that separated the tour group from the room where blue-jump-suited military personnel were watching their computer displays. These personnel comprised the heart of the operation — the NORAD/ U.S. Space Command (USSPACECOM) Command Center.

Suddenly audio and visual alarms went off inside the Command Center and curtains draped at the sides of the large glass window started to close. The public tour in the briefing room was immediately escorted out of the complex by their tour guide with no explanation of what was happening.

"Command Director, this is Missiles. We have a quick alert off of Plesetsk."

Moments later, "Command Director, this is Intelligence — we believe this is the test ICBM launch we were notified about. Stand by for further."

By now, Missiles (the Missile Warning Center) has picked up the operations loop, put the voice connectivity together, and everyone else in the mountain picks up on the event. Emergency action controllers along the outside wall of the Command Center established communications with various other command organizations outside the mountain, including the National Command Authority (NCA) in Ottawa and Washington.

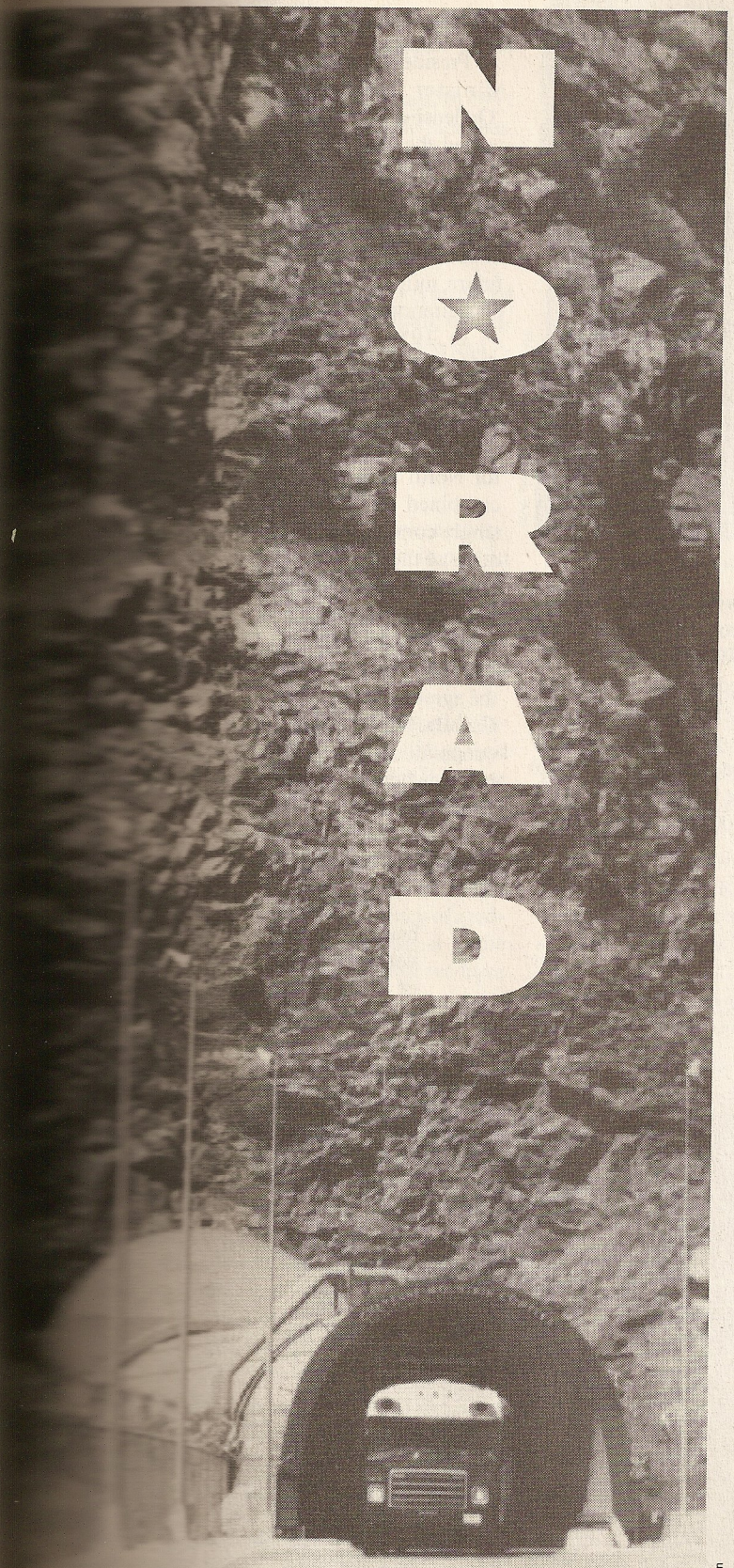
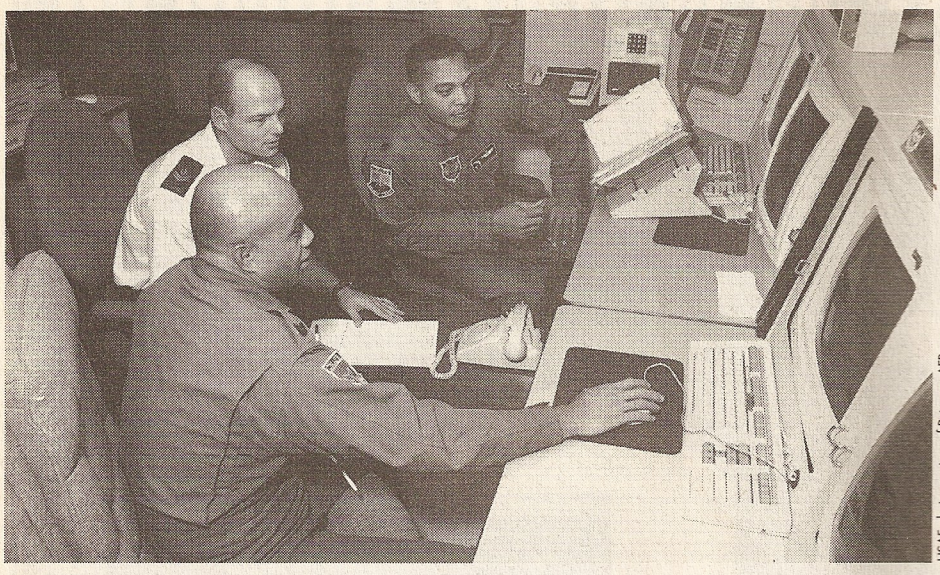


Photo by Harry Baughn

Security in this nuclear-hardened, joint US-Canadian defense facility is extremely tight.



USAF photo courtesy of Peterson AFB

Air Defense Operations Center (ADOC) in Cheyenne Mountain.

As additional data was received from the Pacific Defense Support Program (DSP) satellite, computers send updates to the display consoles indicating the possible flight path of the Russian missile. A fan-shaped symbol, also known as the "Fly Swatter," was superimposed on the world map on the Granite Sentry system displays, indicating the flight path of the missile and potential impact areas.

As the missile continued to burn, the DSP satellite continued to gather infrared signature data and compare it with information in the processor's database. As more information was fed into the computers another round of alarms was triggered.

"Command Director, this is Missiles — we have a missile event from Plesetsk, azimuth 65 degrees; this is an SS-19 ICBM missile test."

At this point, a scrub of all the data in the computers was conducted to make sure this was a real event. Then the Command Director picks up two handsets (one for Ottawa and the other for Washington, D.C.) and announces:

"All stations, this is the NORAD Command Director. High speed data is valid; we have an SS-19 ICBM test launch from Plesetsk, azimuth 65 degrees, heading for an impact on the Kamchatka peninsula. CINC NORAD's assessment is this is not a threat to North America. Any questions?"

Yes, it was just another day at the office for the men and women of NORAD — the North American Aerospace Defense Command in Cheyenne Mountain.

Monitoring Times editor Rachel Baughn, Utility World columnist Larry Van Horn, and staff photographer Harry Baughn recently had the opportunity to travel to Colorado Springs to take an inside look at what goes on, deep within this 9,500-foot-high granite mountain.

Photo by Harry Baughn

These are some of the eyes and ears which bring the outside world to the Mountain.

Background

President Franklin D. Roosevelt and Prime Minister Mackenzie King issued the "Ogdensburg Declaration" in August 1940. It voiced the concept of joint defense. At the end of World War II, collective security for continental defense remained of vital interest to both nations. Ottawa and Washington announced in February 1947 the principles of future military cooperation which included consultation on air defense issues.

In 1954, Royal Canadian Air Force (RCAF) Chief of Staff, Air Marshall C. Roy Slemon, and General Earle E. Partridge, head of the U.S. Air Force Air Defense Command, discussed ways to provide the best defense for North America. Their plan called for a combined air defense organization under a single commander. This plan led to the creation of the North American Aerospace Defense Command (NORAD).

The agreement, signed by the two governments May 12, 1958, set NORAD as the first and only successful binational command. In the agreement between the United States and Canada, NORAD provides a framework for cooperative defense planning and operations between both governments for the defense of North America.

NORAD's Mission

NORAD is responsible to the heads of both governments for surveillance and control of the airspace of Canada and the United States; warning and assessment of an aerospace attack on North America; and, providing an appropriate response should deterrence fail.

For control of its airspace, NORAD maintains an extensive series of radars throughout the U.S. and Canada which provide coverage of all approaches to North America. Additionally, the commander in chief (CINC), who is also the Commander of U.S. and Air Force Space Commands, has access to a wide array of space-borne sensors capable of detecting and tracking missile launches from anywhere in the world, and following the track of aircraft suspected of smuggling illegal drugs into North America.

To accomplish its warning and assessment role, NORAD maintains an integrated tactical warning and assessment (ITW/AA) system. With information from ground-based and space-based sensors, CINC NORAD

can provide timely, reliable, and unambiguous warning of any attack against North America.

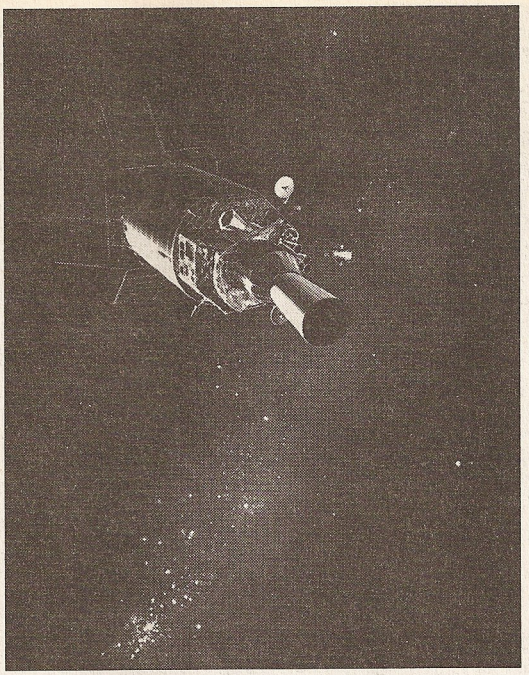
According to NORAD officials, in 1991 NORAD tracked over 600 missile launches, with the rate settling down to over 200 a year during the period 1992-1994. With the proliferation of ballistic missile technology, that number could increase dramatically in the future.

NORAD's response capability is provided by a network of alert fighters along the periphery of North America. U.S. F-15s and F-16s and Canadian F-18s stand ready to intercept and, if necessary, engage any air breathing (airborne) threat to the continent.

The People Make It Work

"The team (the people), the connectivity, and the processes—are the most important part of this whole operation," according to Lt. Gen. J.D. O'Blenis. Gen O'Blenis is the Deputy CINC NORAD and was command director the day that the *MT* staff visited Cheyenne Mountain.

"It doesn't have to be at Cheyenne Mountain," said Gen. O'Blenis of the underground command center. "We are here in Cheyenne Mountain by accident. We were here during the early part of the Cold War to be able to withstand a missile attack. The Cold War is over, and we couldn't withstand an attack now anyway because of the accuracy of modern missiles. We are here because it is the cheapest place to be right now and we have been here for a long time."



DSP satellites play an indispensible role in modern defense.

Inside the Mountain

Cheyenne Mountain serves as a central collection and coordination facility for a worldwide system of sensors designed to provide the CINC NORAD and the National Command Authorities of the U.S. and Canada an accurate picture of any aerospace threat. CINC NORAD maintains his headquarters at Peterson AFB, Colorado, and his hardened command and control center is located a short distance away at the Cheyenne Mountain Air Station.

The best way to describe the operation in Cheyenne Mountain is to think of a six-spoked wheel. Each spoke or command center has a specific responsibility to feed various types of information to the wheel hub (the Command Director) in the command center. All of this information is used to help the NORAD command director answer the fundamental question: "Is North America under attack?"

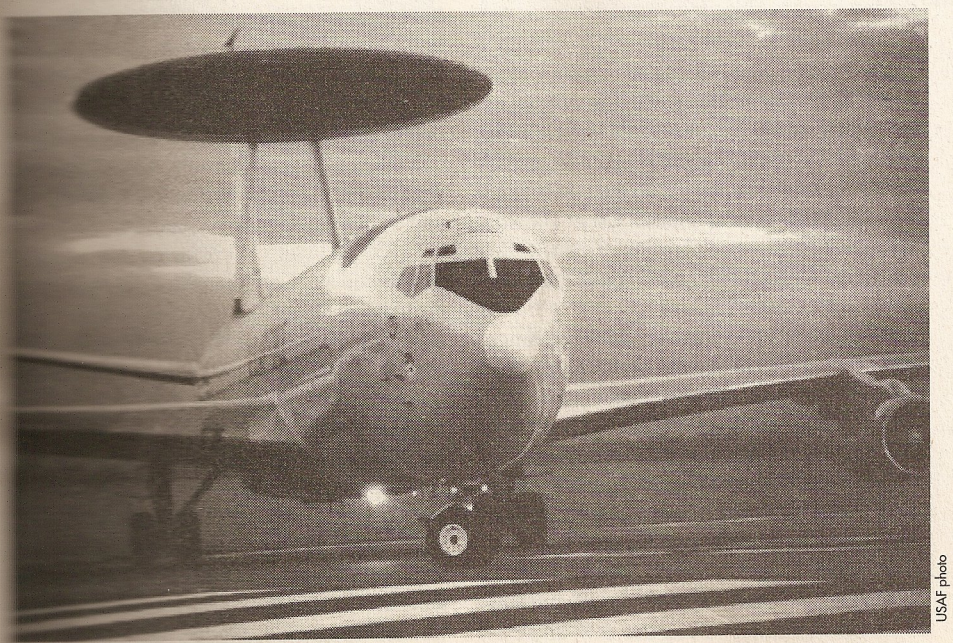
The first of these spokes is the **Missile Warning Center (MWC)** which processes ballistic missile events. It is responsible for providing surveillance and ballistic missile attack warning data to NORAD, and warning of ballistic missile attack to commanders-in-chief worldwide. The MWC is the terminus for the Missile Warning Network, a worldwide network comprised of sophisticated space-based (e.g.. DSP satellites) and land-based sensors (e.g.. Pave Paws radar) used to detect and track ICBMs, SLBMs, manned bombers, and cruise missiles anywhere in the world.

Gen O'Blenis pointed out that the DSP system was designed to detect large missiles; consequently, the U.S. has decided to build a replacement system called SBIR (Space Based Infrared) which will supplant the DSP satellites. SBIR is a whole new technology—a steering technology versus a sweeping technology. The reason for building a new system is the deficiency in the DSP's ability to see very small missiles. Such missiles are not necessarily less powerful or of shorter range, but missiles are becoming more efficient and will be even more so in ten years.

The newer missiles burn cooler and shorter. They will have more efficient propulsion systems. The intention behind SBIR is to keep up with such developments. During the Gulf War, we saw all the Scud missiles fired by Iraq, but we were getting very close to the threshold. If there had been a lot of cloud cover we might not have seen them, because some of the burn might have been masked by the moisture in the air. It is possible that a Scud missile, launched in the right place at the right time, would not show up on NORAD's systems.

Meanwhile, we now have a tactical event system that U.S. Space Command put together which uses modern processors to build stereo pictures. It is designed to enable the DSP satellites to see the smaller missiles. Using better software on the same data, it is possible to get a better product.

The next spoke in the wheel is the **Air Defense Operations Center (ADOC)** which works closely with its three subordinate re-



USAF photo

USAF AWACS aircraft taxi to the runway.

TABLE 1 — NORAD UHF Air Intercept Frequencies

(All frequencies in MHz)

Western Air Defense SOCC: McChord AFB, Washington
Remote Sites: Mt. Lemmon, AZ; Crescent City, CA; Mill Valley, CA; Mt. Laguna, CA; Paso Robles, CA; Point Arena, CA; San Clemente, CA; Vandenburg, CA; Brushey Mtn, NM, CA; Kalispell, MT; Malstrom, MT; Roy, MT; Finley, ND; Watford City, ND; Keno, OR; Salem, OR; El Paso, TX; Ellington, TX; Laughlin, TX; Odessa, TX; Oilton, TX; Makah, WA; McChord, WA; and Mica Peak, WA.

228.6	228.9	234.6	235.9	238.4	239.7	252.0	254.2	260.8
265.4	267.0	270.2	271.0	274.4	277.6	281.6	282.6	288.4
298.1	309.4	316.3	320.6	324.0	327.9	328.0	336.6	341.8
346.2	348.2	351.5	355.2	359.8	374.0	377.0	386.0	387.8
390.2	394.2	397.8	398.0					

Southeast Air Defense SOCC: Tyndall AFB, Florida
Remote Sites: Cross City, FL; Ft. Lonesome, FL; Key West, FL; Patrick, FL; Richmond, FL; Tyndall, FL; Whitehorse Field, FL; Lake Charles, LA; Slidell, LA; Fort Fisher, NC; Jedburg, SC; Ellington, TX; Oilton, TX; and Oceana, VA.

228.8	234.7	238.5	251.0	256.6	263.2	270.4	275.0	278.6
292.7	298.5	302.4	306.4	325.5	338.4	344.0	356.0	369.0
375.1	386.2	392.8						

Alaskian Air Defense ROCC; Elmendorf AFB, Alaska
Remote Sites: Barter Island, AK; Cape Lisburne, AK; Cape Newenham, AK; Cape Romanzof, AK; Cold Bay, AK; Elmendorf, Ak; Ft. Yukon, AK; Galena, AK; Indian Mtn, AK; Kotzebue, AK; King Salmon, AK; Murphy Dome. AK; Oliktok, AK; Pt. Barrow, AK; Pt. Lay, AK; Sparrevohn, AK; Tatalina, AK; and Tin City, AK.

229.1	238.4	240.2	254.5	254.6	261.6	261.7	262.4	264.4
269.9	278.0	287.5	288.4	292.0	293.2	297.6	297.8	315.4
325.0	325.8	364.2	397.8					

Northeast Air Defense SOCC: Griffiss AFB, New York
Remote Sites: North Truro, MA; Buck's Harbor, ME; Empire, MI; Wurstmith, MI; Nashwauk, MN; McGuire, NJ; Lockport, NY; Remsen, NY; Riverhead, NY; Sanborn, NY; Suffolk Co, NY; and Utica, NY.

228.7	228.8	229.1	233.6	235.8	239.2	239.4	251.8	258.0
273.4	278.2	278.4	282.5	284.8	292.4	292.8	293.6	297.7
298.8	303.9	309.5	312.8	316.2	318.1	318.4	326.4	327.2
338.8	342.1	347.4	348.8	351.6	357.1	371.0	371.8	376.2
379.0	384.0	389.2	394.8	396.8	399.0			

Miscellaneous Alert/Air Defense Frequencies:

148.125	276.4	276.65	279.4	285.9	298.3	397.25

Canadian Dewline ATC frequency: 123.550

gions to maintain a clear picture of the "air breathing" (aircraft and cruise missiles) threat. The three NORAD regional headquarters are located at Elmendorf AFB, Alaska (Alaska NORAD Region, ANR); North Bay, Ontario (Canada NORAD Region, CANR); and Tyndall AFB, Florida (Continental U.S. NORAD Region, CONR). These three regional operations centers receive direction from CINC NORAD and control operations within their respective areas of responsibility.

The Canadian and CONUS (Continental U.S.) regions are further subdivided into NORAD sectors, each supported by a sector operations control center (SOCC). The Canadian NORAD Region Headquarters and two SOCC's — one for the Canada East Sector (callsign Sidecar) and the other for the Canada West Sector — are collocated in an underground complex 600 feet below Canadian Forces Base in North Bay.

The CONUS NORAD Region consist of three SOCC's: the Western SOCC at McChord AFB near Tacoma, Washington (callsign Big Foot/Deer Hunter); the Southeast SOCC at Tyndall AFB near Panama City, Florida (callsign Oak Grove); and the Northeast SOCC at Griffiss AFB, Rome, New York (callsign Huntress/Northern Lights).

A network of more than 90 long-range radars in the U.S., Canada, and Alaska provides air defense surveillance data to the SOCC's and regional command centers. NORAD fighter alert forces are under operational control of the sectors to perform the air sovereignty intercept mission and to defend against hostile aircraft and cruise missiles if necessary.

The SOCC's use a sophisticated series of UHF remote stations along the U.S. and Canadian coastlines to communicate with their interceptor fleet of aircraft. A list of these remotes and their frequencies can be found in Table 1.

These armed interceptors are on 24-hour alert at several locations around the continent. NORAD alert fighters identify unknown aircraft, some of which may be Soviet bombers probing North American air defenses or passing through air defense identification zones. The fighters help NORAD distinguish between a civil aircraft which may have strayed off course and a hostile bomber or cruise missile that could be attacking North America.

These fighter crews stand ready round-the-clock for the identification mission, to monitor suspected aerial drug traffickers, and to assist aircraft in distress or escort special interest aircraft in the NORAD area. Many more fighters can be made available at higher states of alert. These include aircraft from the U.S. Air Force and Air National Guard training units, U.S. Marine Corps, U.S. Navy, and the Canadian Forces Fighter Group. Strict rules of engagement prevail, and in over 35 years of operation NORAD fighters have never fired upon another aircraft.

NORAD interceptor forces consist of:

—F-15 Eagle and Canadian CF-18 Hornet fighters. Both aircraft have excellent radar and armament for bomber and cruise missile threats.

—F-16 Fighting Falcon that replaced F-106s and the F-4s of the U.S. Air National Guard.

To support the interceptors, CINC-NORAD can draw on E-3 Airborne Warning and Control System (AWACS) aircraft for additional radar coverage of the North American continent. These AWACS aircraft are all part of the 552nd Operations Group based out of Tinker AFB in Oklahoma. AWACS squadrons of the 552nd consist of the 963, 964, 965 and 966th Air Control Squadron.

NORAD can also draw on Air Mobility Command and Canadian Air Command tankers to increase the range and endurance of the interceptors. A list of HF backup frequencies and UHF frequencies for AWACS communications can be found in Table 2.

The next center that provides input into the hub is the **Space Control Center (SCC)**. It is responsible for maintaining the overall picture of space activity. The SCC detects, tracks, catalogs, and identifies all man-made objects orbiting the earth. The center is the terminus for the Space Surveillance network which is composed of radars, telescopes, cameras, and radio receivers.

This worldwide network of sensors makes [illegible] to 50,000 observations a day. The center is currently tracking about 7,050 space objects orbiting the earth. SCC is also the operations center for space control, and is responsible for protecting U.S. and Allied space systems by monitoring space and space-related activity, and informing members of the space community of pertinent events.

Gen. O'Blenis pointed out in our briefing that objects on orbit do not change very rapidly. "The laws of physics keep spacecraft in the same orbit unless they maneuver — and we don't see them all the time. We see them for a little bit, then we see them for a little bit, then we see them for a little bit again; then we put that together to make a model. Space track is not like a radar track of an airplane. Radar tracks on an aircraft and it is updated continuously. With a space track, you have your sensors on the ground, and as the object passes over you take a shot, then another shot, then another shot. Then you put that together and you build a computer model and the computer model tells you where everything is all the time. So you aren't actually going to see it all the time."

The **Weather Center (WC)** advises the command center about atmospheric weather at sensor sites as well as solar activity. NORAD uses satellite communications extensively, which can be adversely affected by sunspots and solar flares. Geomagnetic activity is also monitored in order to differentiate between

USAF photo courtesy of Peterson AFB

Space Control Center (SCC) in Cheyenne Mountain.

real world events and weather-related phenomena.

The **Systems Center (SC)** monitors the configuration of close to 100 on-line computer systems in the complex. This center is also responsible to monitor the environmental systems maintained within the complex (e.g. air quality, water purity, status of electrical power generation, etc.)

Finally, the **Intelligence Center** (IC) is a joint NORAD/USSPACECOM agency and one of the 11 primary centers in the DoD Indications and Warning (I&W) Systems. It provides to the Command Center expert and timely intelligence data as well as to the Commander in Chief NORAD and his senior advisers.

There was one important thing that made a lasting impression on the *MT* staff during our visit to "The Mountain." To some it is just a 100 million-year-old, hollowed-out mountain at the eastern edge of the continental divide with a lot of fancy equipment in it. But this special place is more than that. All of the hardware at NORAD's command would be useless without the people to operate it. As we saw and heard in each of the various command centers we visited, the most precious resource is not the granite mountain: It is — to quote the General — "this team which is unique in the western world."

The staff of Monitoring Times *would like to extend its sincere appreciation to General J.D. O'Blenis - Deputy CINC NORAD, the NORAD battlestaff team, and the entire public affairs staff at NORAD/USSPACECOM— especially Major Don Planalp, for their assistance during our recent tour of "The Mountain."*

TABLE 2
NORAD HF Frequencies

(All frequencies in kHz)

[illegible] Coordination Nets (USAF):				
[illegible]	6735	6750	8967	9023
[illegible]	13207	18027		
[illegible] Frequencies (USAF):				
[illegible]	2544	3384	5171	6131
[illegible]	6540	6947	10194	10895
[illegible]	11016	11740	13670	14364
[illegible] USAF Air Defense Frequencies:				
[illegible]	4865			
[illegible] Air Defense Frequencies:				
[illegible]	4721	4738.5	5718	5804
[illegible]	6735	6745.5	6750	8967
[illegible]	9014	9023	11214	11256.5
[illegible]	13225.5	15026	18027	23271
[illegible] Rapier Teams:				
[illegible]	6634.5	10280	10647	15715
[illegible]	20870	20873	26818	26910

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