



NORAD

NORTH AMERICAN AIR DEFENSE COMMAND

★ every minute...

★ every hour...

★ every day...

★ the year round...

NORAD forces are on alert

Radar scans the air approaches to the North American continent from this typical site in the bleak Arctic.



NORAD

DEDICATED
TO
DETERRENCE

THE story of the North American Air Defense Command (NORAD) begins with 200,000 dedicated men and women. Some of them are on duty day and night, around the clock, every day of the year. It is they who make the NORAD system work.

They are standing alert in the far north, on desolate mountain tops and during long hours of the night because it is U.S. and Canadian national policy that we can deter general war only by being constantly ready to fight such a war.

There are two elements of the deterrent posture centered on the North American continent. One element is the strategic retaliatory force, the bombers and missiles of the Strategic Air Command. The second element is the aerospace defense resources of Canada and the United States as combined in NORAD.

NORAD's contribution to the deterrent posture is two-fold. In the first place, this command provides warning to air defense and strategic retaliatory forces. A warning system is absolutely necessary if we are to convince an aggressor that a surprise attack would fail. Secondly, it is NORAD's task to provide an active defense force capable of fighting an air battle. A potential aggressor must realize that he will suffer heavy losses if he launches an air attack against this continent. This active air defense, combined with warning to the military and civil populace, will enable our two nations to survive. And that, plus the certain devastation of his own homeland, must convince the aggressor that the chances of failure are too great.



THE COMMANDERS :



GENERAL DEAN C. STROTHER

*Commander-in-Chief
North American Air Defense Command*

General Dean C. Strother, a veteran combat fighter pilot who played a major role in halting the Japanese Pacific advance in World War II, has been the Commander-in-Chief since April 1965.

General Strother, a native of Winfield, Kansas, graduated from the U.S. Military Academy in 1931 and won his wings at Kelly Field, Texas, the following year. Following routine pre-war duties, including a tour as air mail pilot, he arrived in the South Pacific in July 1942. The General held a series of key staff and command jobs, concluding his tour of duty as commander of the Solomon Islands Fighter Command.

General Strother was flown to Italy in February 1944 to command the 396th Fighter Wing and later the 15th Fighter Command. During this tour he led a fighter task force to Russia to aid the Russian offensive in the East. While there, he won the Silver Star for gallantry in action. Post war duties include tours with Air Transport Command, Hq USAF, and 4th Allied Tactical Air Forces.

In 1953, he became Deputy Commander and then Commander of the Air University. These assignments lasted until July 1958, when he was appointed Deputy Chief of Staff for Operations at Hq USAF. On 1 November 1962 he was promoted to General with duty as U.S. Representative to the Military Committee and Standing Group, North Atlantic Treaty Organization.

His major decorations include the Distinguished Service Medal with cluster, Silver Star, the Distinguished Flying Cross, Air Medal with three Oak Leaf clusters, plus awards from Britain, France, and Greece.

The terms of the agreement between Canada and the United States which established NORAD specify that the Commander-in-Chief (CINCNORAD) and his deputy cannot be from the same country. The Commander-in-Chief is currently a U.S. Air Force general and his Deputy a Royal Canadian Air Force air marshal.



AIR MARSHAL C. R. DUNLAP
*Deputy Commander-in-Chief
North American Air Defense Command*

Air Marshal C. R. (Larry) Dunlap won his pilot wings in 1929 following graduation from the Nova Scotia Technical College and Acadia University.

Many of his early flying years were spent mapping and photographing Canada's remote areas. Posted overseas to the European Theater of Operations in 1942, he served as base commander in the famed all-Canadian No. 6 Bomber Group in Yorkshire, commanded a bomber wing in Tunisia and established RCAF bases there to support Allied landings in Sicily and Italy. He returned to the U.K. in late 1943 to command a medium bomber squadron of the 2nd Tactical Air Force in support of the Normandy landings and the ensuing campaign, and finally returned to No. 6 Bomber Group as a base commander.

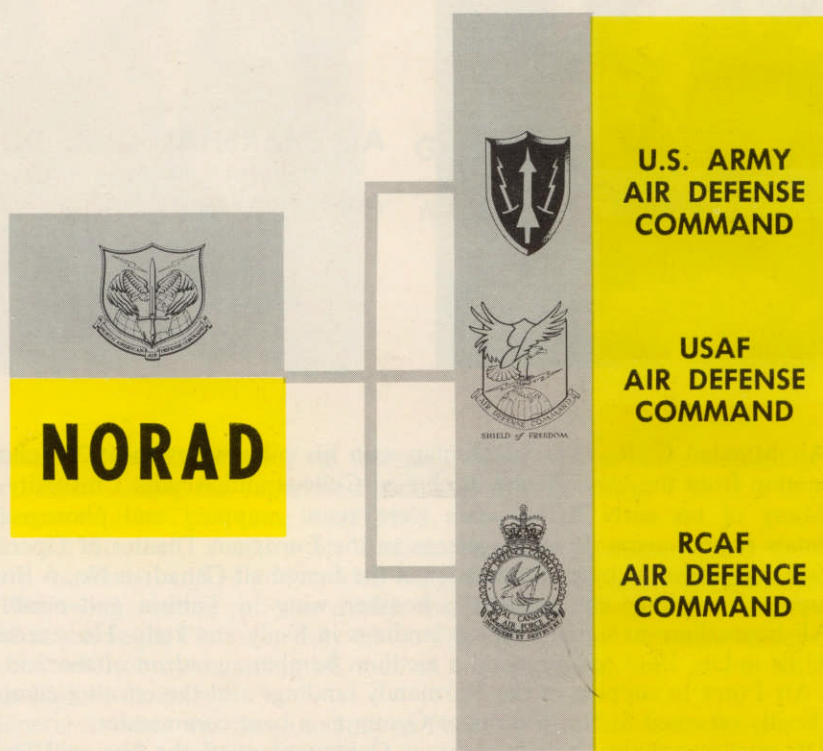
His post-war duties include tours as Commandant of the National Defense College from 1951 to 1954, and Vice Chief of Staff from August 1954. In June 1958 he was assigned to Supreme Headquarters Allied Powers Europe (SHAPE) in Paris as Deputy Chief of Staff for Operations. Later he was appointed SHAPE's Assistant Chief of Staff.

Air Marshal Dunlap was named Chief of the Air Staff in April 1962. He assumed the position on his return from Paris in September of that year and relinquished it to become Deputy Commander-in-Chief of NORAD on August 15, 1964. Illustrative of his service with joint allied commands is the fact that he is Commander of the Order of the British Empire, and holds the United States Silver Star and the French Croix de Guerre.

A JOINT ORGANIZATION TO MEET A COMMON PROBLEM

In this age of supersonic bombers and missiles, air defense of North America is a common problem which must be met by a joint organization immediately ready to meet an attack. NORAD is that organization.

The aerospace defense forces of NORAD are provided by three component commands as shown here:

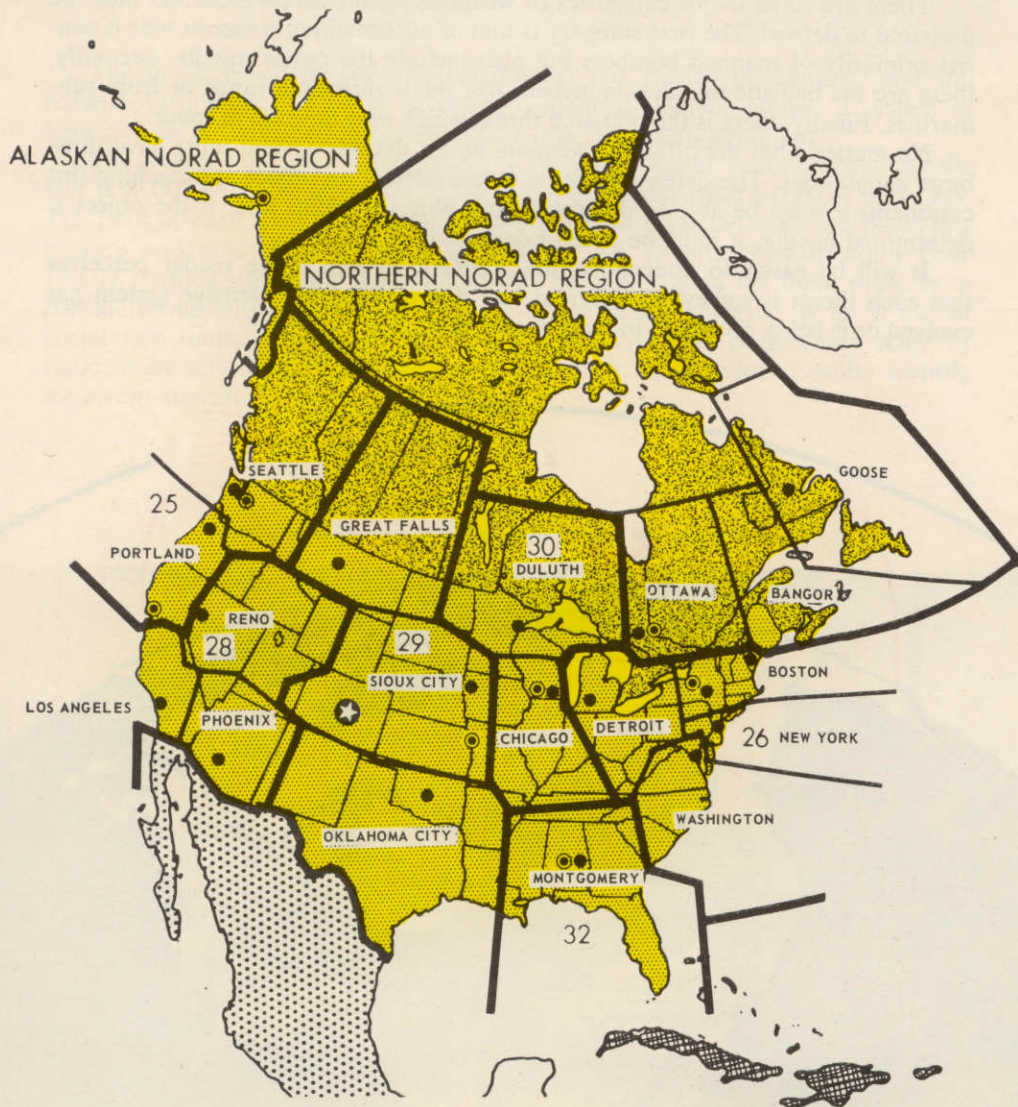


To accomplish his mission, CINCNORAD has been given operational control of the total air defense forces of the U.S. and Canada. This means that he has the authority to coordinate, direct, and control the combat efforts of these forces without regard to branch of service or to the international boundary between the two countries.

The integration of the NORAD system can be observed easily at Headquarters NORAD in Colorado Springs where uniforms of all four U.S. military services, as well as Royal Canadian Air Force and Army, mingle together in the offices and corridors.

THE ORGANIZATION

NORAD is responsible for the air defense of a land area encompassing over 10 and one-half million square miles, which includes the homes of some 211 million persons. In order that CINCNORAD can manage his forces in this vast area, the continent has been divided into regions. These regions are further broken down into sectors. A glance at the adjacent map shows that the international boundary plays no part in establishing either region or sector boundaries.

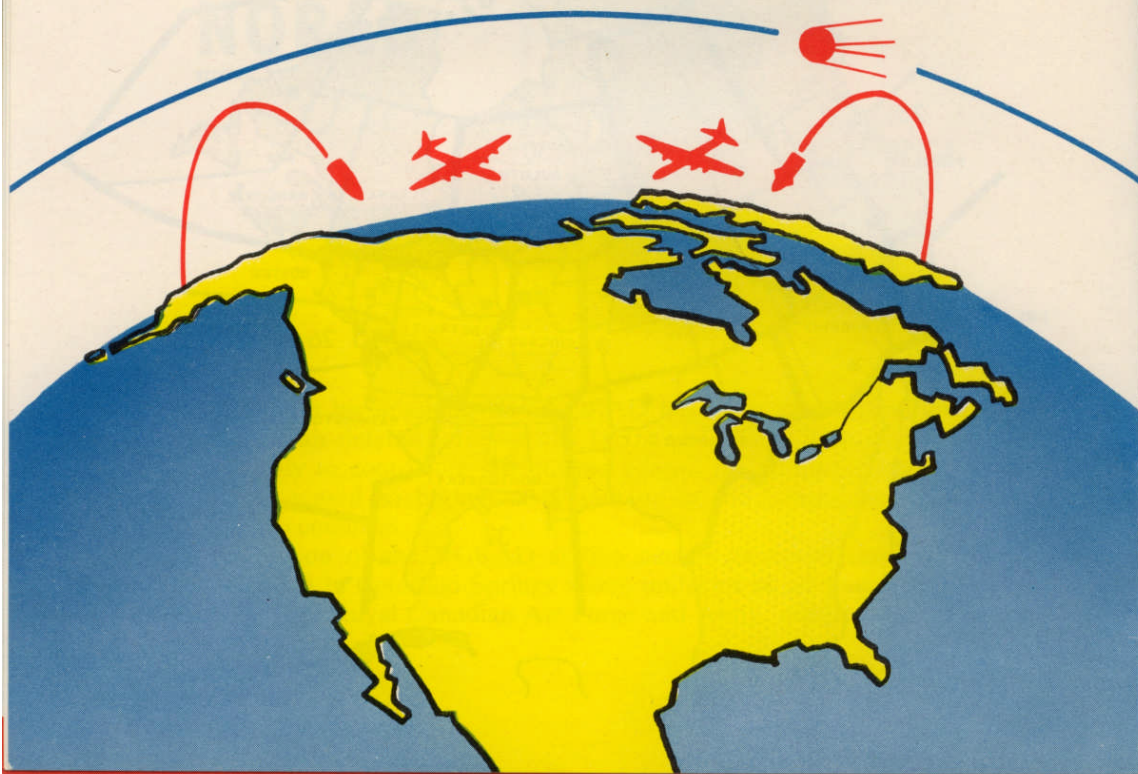


- **DETECT**
- **DETERMINE INTENT**
- **DESTROY**

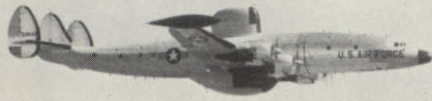
There are three major categories of weapons against which NORAD must be prepared to defend. The first category is that of air breathing weapons which consist primarily of manned bombers but also include the cruise missile. Secondly, there are the ballistic missiles, launched over intercontinental range or from submarines. Finally, there is the potential threat which may develop in space.

No matter what the offensive weapon, an air defense system must have three basic capabilities. The defense must be able to detect an object approaching this continent; it must be able to determine that object's intent; and, if the object is determined hostile, it must be able to destroy it.

It will be easier to understand the NORAD system if the reader perceives that each threat is somewhat different and that a different defensive system has evolved or is being projected to meet each threat.



DEFENSE AGAINST MANNED BOMBERS



The threat posed by the manned bomber has existed the longest, and still remains formidable. In order to detect a manned bomber attack, a system of land and air based radars surrounds the North American continent.

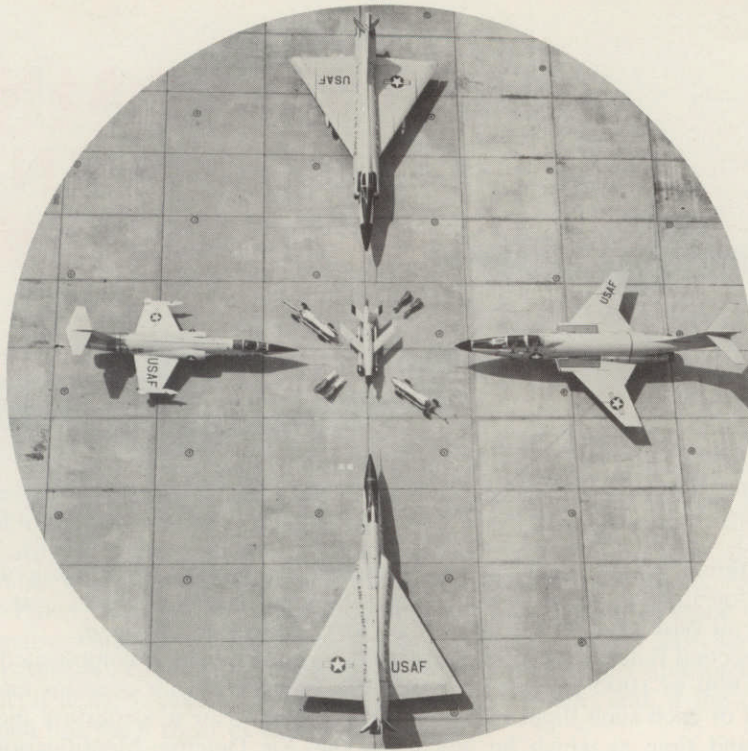
The second function of air defense, to determine intent, is complicated by the fact that 600 to 1000 aircraft approach this continent from overseas each day. The pilot of each such flight must file a flight plan prior to departure indicating a place and time at which he will cross the Air Defense Identification Zone (ADIZ) which surrounds the continent. If he makes good his flight plan, he is considered identified and determined to be peaceful; however, if he is out of correlation limits, he must be positively identified. This is normally done by radio or by scrambling fighter-interceptor aircraft whose pilots visually identify the errant aircraft.

F-104 pilot races to aircraft during air defense intercept mission.



F-102

F-104



F-101

F-106

If aircraft are determined to be hostile, NORAD has a formidable arsenal of defensive weapons to meet them. Both the U.S. Air Force and the RCAF provide supersonic fighters armed with a variety of air-to-air missiles and both commands also have Bomarc surface to air missiles. In addition, the U.S. Army provides point defense for major cities and military targets in the form of Nike Hercules and Hawk surface-to-air missiles.

HAWK missiles guard southern Florida.

Canadian BOMARC rises to launch position.



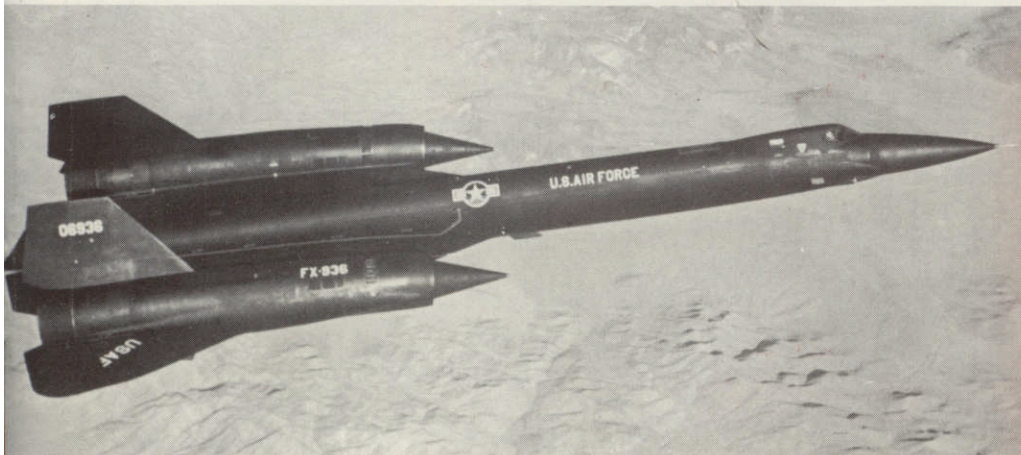


Complex SAGE system relies on trained personnel.

Tying the various elements together is the Semi-Automatic Ground Environment System (SAGE). SAGE is based on high speed digital computers which collect, correlate and display information to commanders at all levels. SAGE also provides intercept data to fighter aircraft and Bomarc missiles.

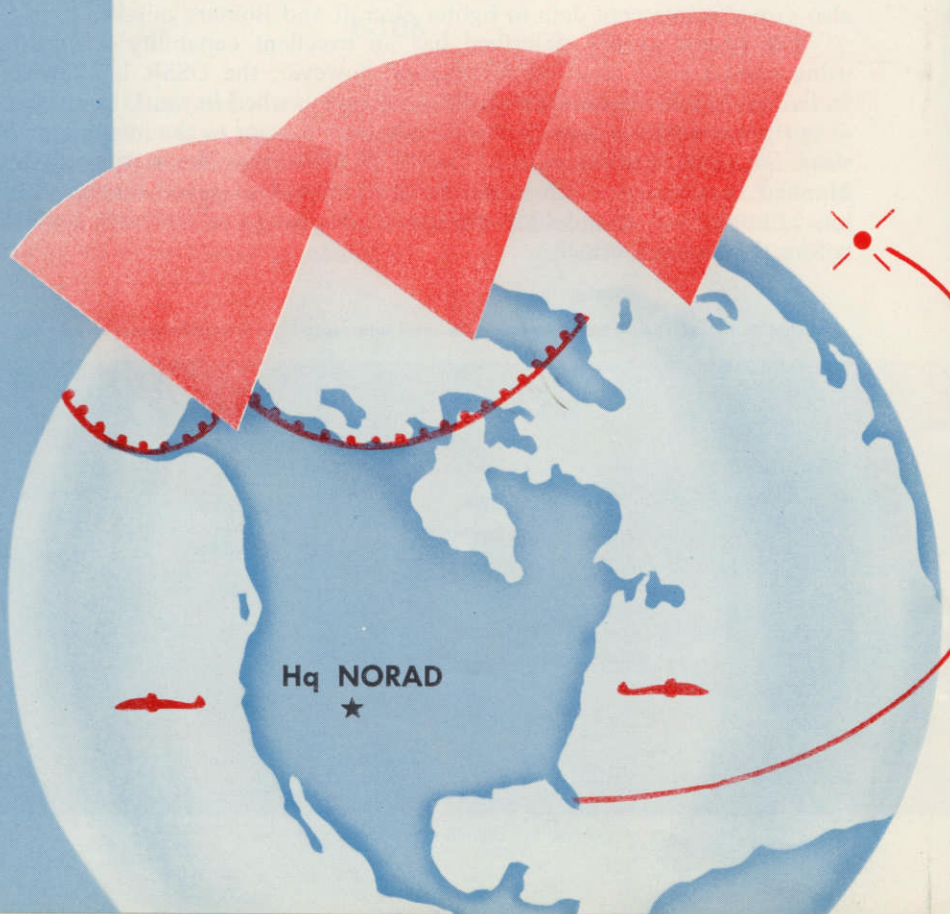
The system briefly described has an excellent capability against bombers using conventional bombing techniques; however, the USSR has developed effective air-to-ground missiles which could be launched beyond the range of some of our present interceptors or could be launched prior to the interceptor reaching them. This is one of the reasons that NORAD would like to have an Improved Manned Interceptor which would be more effective against targets at high and low altitudes and would have the speed and range to intercept bombers long before they launch missiles.

YF-12A — advanced experimental interceptor under evaluation.



THE BALLISTIC MISSILE THREAT

The Soviet Union is the only nation at this time with missiles able to strike North America. Because of this fact, NORAD's detection devices against the ICBM are oriented to the north. The radar fans of the Ballistic Missile Early Warning System (BMEWS) cover the Eurasian land mass and would give 15 to 20 minutes warning in the event of an ICBM attack. This is enough time to alert the military and civil populace to take protective measures and to insure that our retaliatory forces could be launched. There is, at present, no system to warn of a ballistic missile attack launched from submarines or from the south. Detection of a missile, of course, also determines its intent since an object destined to impact on North America can be presumed hostile.

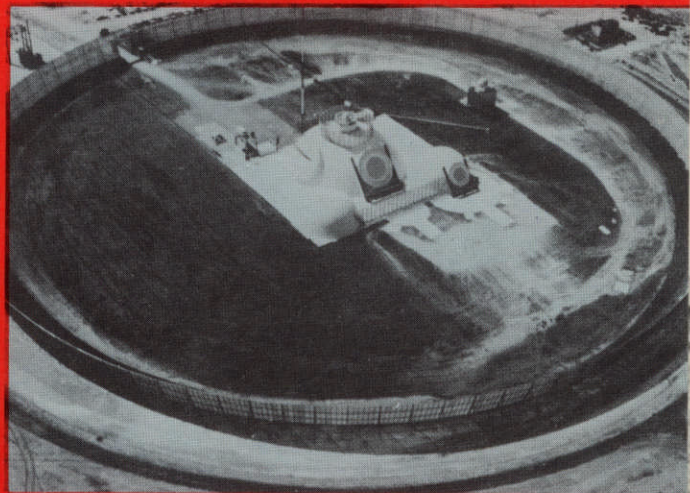




BALLISTIC MISSILE DEFENSE

NORAD's first and perhaps most important problem is the fact that we have no active defense against the ballistic missile. One hope we have for a missile defense within this decade lies in the United States Army's Nike X anti-missile system. However, it is still in the research and development stage.

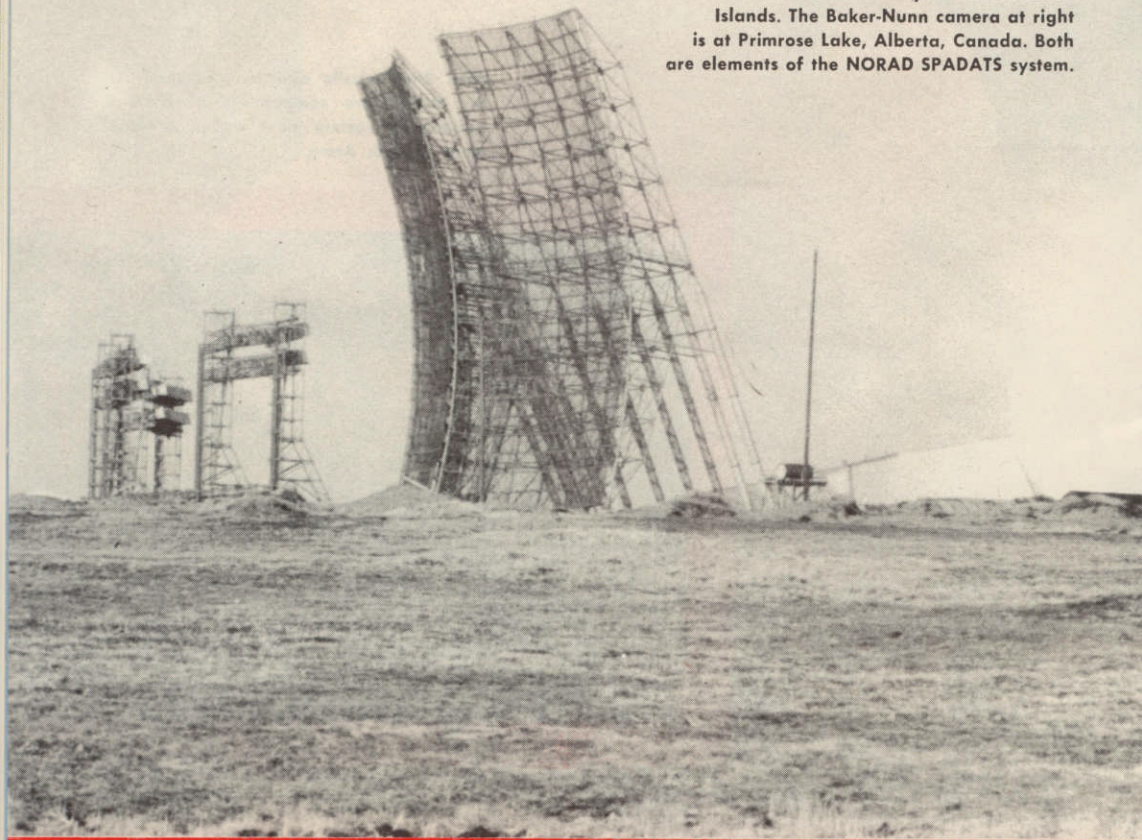
Nike Zeus missile and Multi-function Array Radar are components of Nike X anti-missile system now under development by U.S. Army.



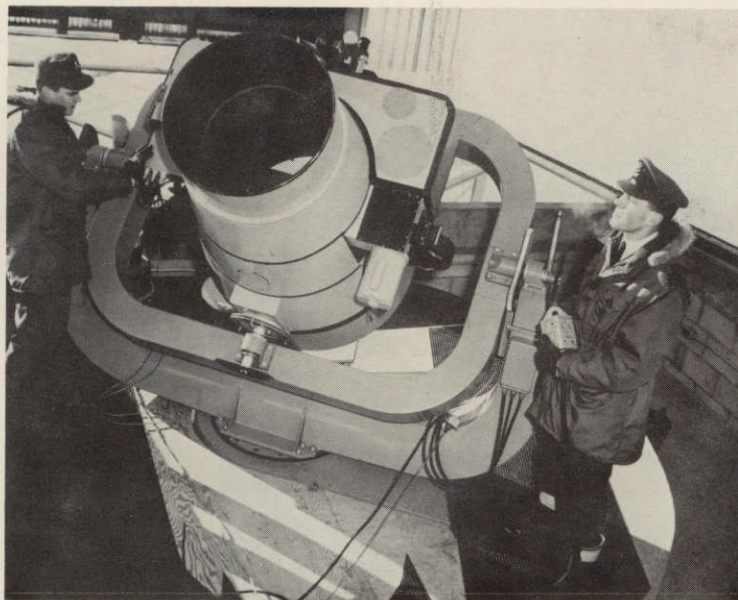
SPACE DETECTION &

The newest system in NORAD is the Space Detection and Tracking System (SPADATS) whose mission is to keep track of everything launched into outer space. SPADATS does this job by gathering data from a variety of military and civilian electronic and optical sensing devices located throughout the world. A computer keeps count of the orbital elements and other information on all objects whirling through space. SPADATS catalogued its 1000th man-made object in space in March of 1965.

The fixed and rotating radars shown below are located on Shemya in the Aleutian Islands. The Baker-Nunn camera at right is at Primrose Lake, Alberta, Canada. Both are elements of the NORAD SPADATS system.



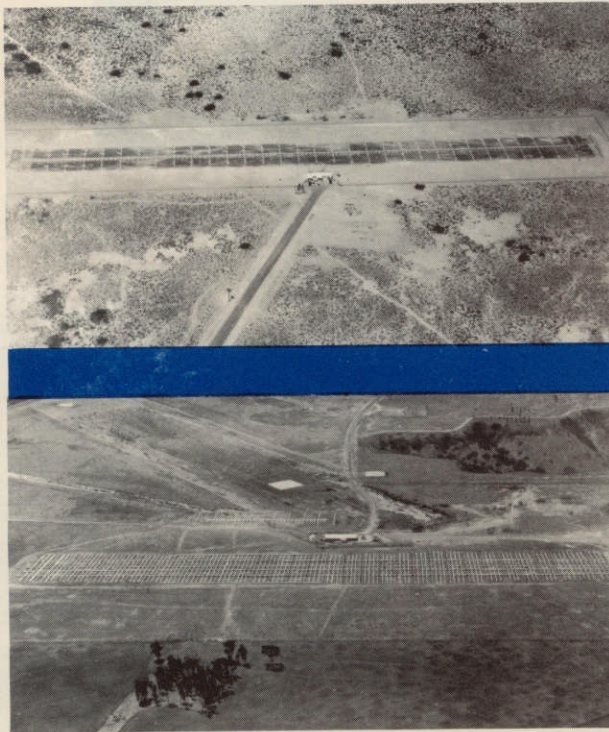
TRACKING SYSTEM



The detection and tracking devices which make up SPADATS are called sensors. These sensors are operated by a variety of civilian and military space agencies and SPADATS is thus a combination of many separate systems. For example, we get data from the networks which have been built by the civilian space agency to track their satellites. The United States Navy and Air Force and the RCAF provide sensors to detect satellites launched by non-cooperating nations such as the Soviet Union.

SPADATS SENSORS

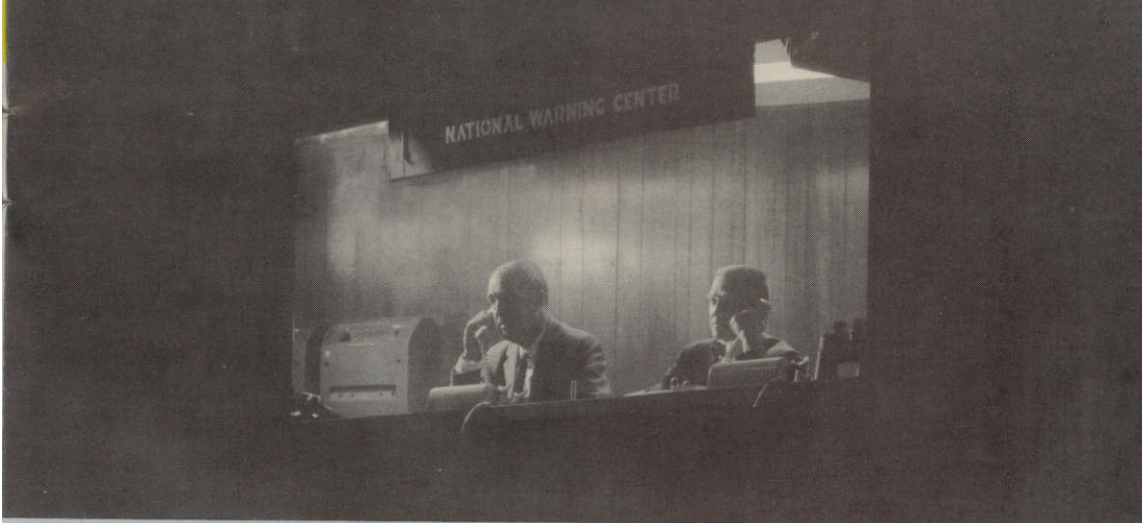
The United States and Canada stand for the free and peaceful use of space by all nations; however, this does not mean that we should not pursue a research and development program which would give us a defensive capability in space if necessary. President Johnson announced late in 1964 that we do have the capability to intercept and destroy, if necessary, a satellite which threatens the free and peaceful use of space. The present task is to stay abreast of the rapidly changing space technology which could permit the USSR to develop a greatly increased military capability.



This 50 KW transmitter is located at Gila River, Arizona. It is part of the U.S. Navy's Space Surveillance System located across the southern U.S.

Receivers such as this one near San Diego, Calif., detect radio energy signals reflected by space objects that penetrate the Surveillance "fence."

THE NERVE CENTER OF NORAD



Office of Civil Defense personnel man the National Warning Center the year round.

All elements of the air defense structure are tied together by a command and control system which reaches its apex at the Combat Operations Center in Colorado Springs. The world's largest communications system, some 16,000,000 circuit miles, feeds information into this and other command centers where it is displayed and analyzed. It is from the COC that CINCNORAD and his staff would direct the air defense of North America. It should be noted that human beings and not computers will exercise the final decisive judgement. Also in the COC is the National Warning Center manned by civilian duty officers of the Office of Civil Defense. This ensures that the civil populace of the two nations will get warning of an impending attack as soon as possible.

The controllers' dias and major displays of the NORAD COC.



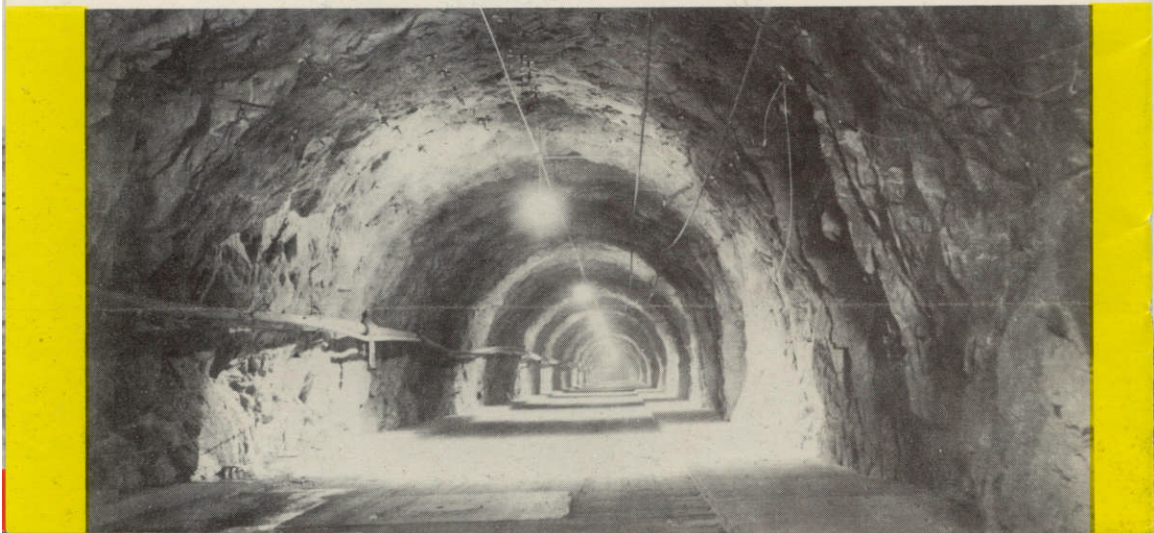


THE NEW COC

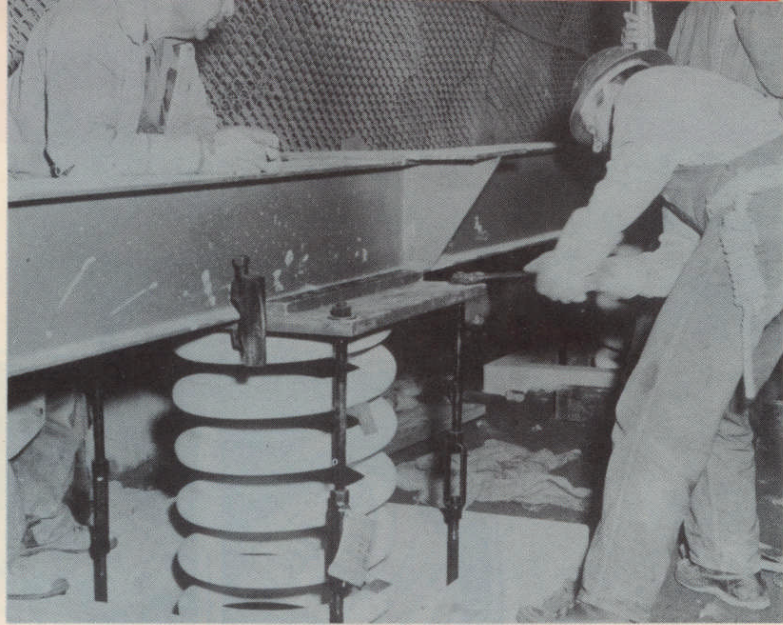
Antennas are hardened to protect them against the shock of a nuclear explosion.

The present Combat Operations Center will be replaced in the near future by a new site beneath Cheyenne Mountain, just south of Colorado Springs. Over one million tons of granite were dug from this mountain and the equipping of steel buildings within the tunnels is far advanced. This facility will have the highest degree of survivability from nuclear attack ever achieved and will thus contribute to making it unlikely that such an attack will take place.

The north tunnel leading into the new underground COC.



The steel buildings within the new underground complex are supported by coiled springs. These springs help the buildings absorb heavy shock waves.

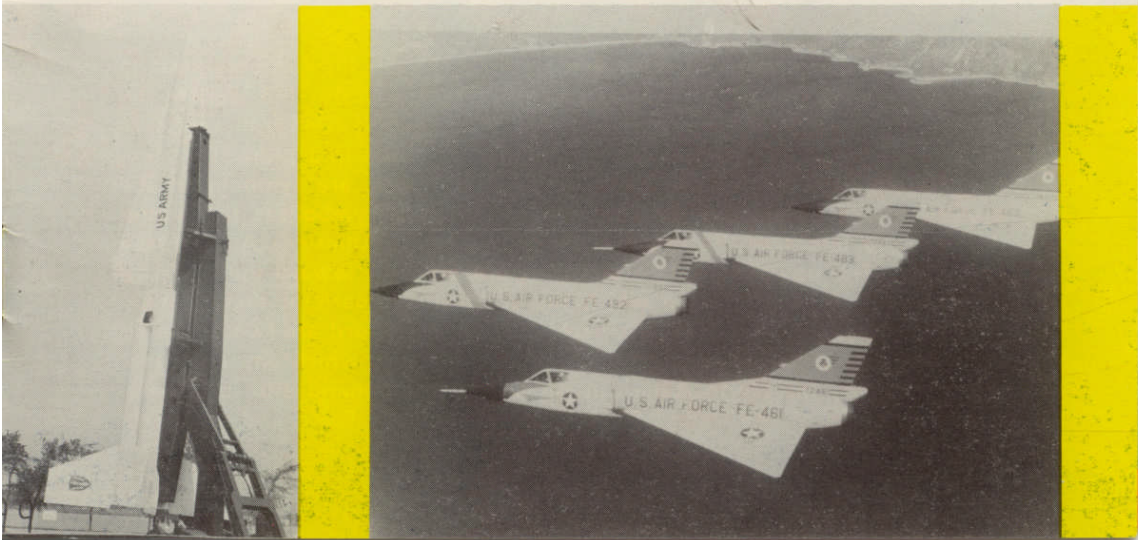


THE CHALLENGE OF OBSOLESCENCE

The North American Air Defense Command finds itself today in an extremely dynamic situation. A new offensive weapon or a new defensive capability can alter the entire picture significantly. It is the old game of offense versus defense carried on at an incredibly high level of complexity. The defense as always has the more difficult task but NORAD must meet the challenge of obsolescence and change. Aerospace defense is vital to the security of Canada and the United States and consequently to the security of the entire free world.

Nike Hercules in position.

F-106's are mainstays of interceptor force.





The blue background of the shield signifies the air; the turquoise waters on the globe denotes the sea; the gold continent indicates the land — the three environments in which any defense of the North American continent would take place. The silver wings enfolding the globe in a protective manner, issuing from behind the globe and out of space, are symbolic of the protection and defense of the continent. The sword symbolizes the armed defense and might of the components of the North American Air Defense Command. The upward position of the sword pointing toward the northern skies represents the direction which the shortest approach of the potential aggressor might be expected. Discharging from the sword are two lightning bolts portraying the instantaneous striking power with which any aggressor will be met by the North American Air Defense Command and its components; elements of the United States Army, Navy, Air Force and the Royal Canadian Air Force.