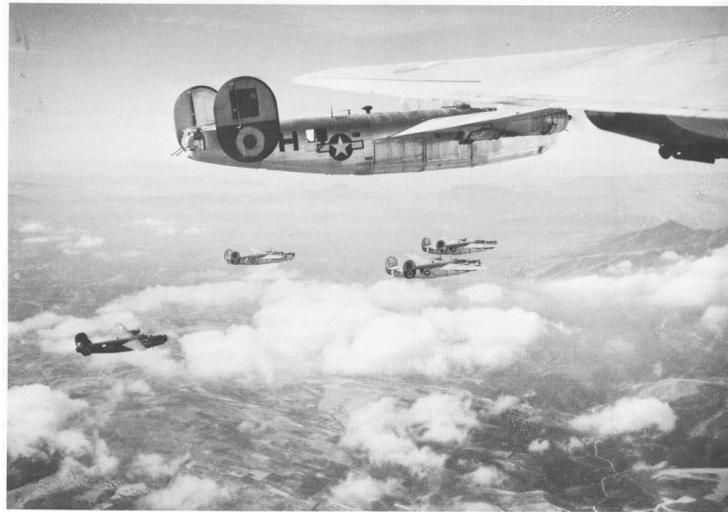


*From Air to Space: A Brief History of the 460th
Space Wing and Buckley Air Force Base*



Buckley Air Force Base, Colorado

Prepared by the 460th Space Wing History Office
January 2017

Approved for public release by the 460th Space Wing Public Affairs office

On the Cover: Top photo—Formation of B-24s of the 460th Bombardment Group. Bottom photo—One of the large radomes of Buckley Air Force Base, circa 2003.

Frontispiece



The current emblem of the 460th Space Wing was approved on 10 April 2012.

Description: Azure, in chief a winged eye Proper, wings extended fesswise Argent, the eye emitting six rays throughout Or, three in pile to chief and three in pile reversed surmounted in base by a demi-globe Celeste, gridlined Sable, encircled by two elliptical orbits in saltire of the second, each surmounted at dexter and sinister apex by a pole star of four points Yellow garnished Gold Brown, all within a diminished border of the third.

Significance: Blue and yellow are the Air Force colors. Blue alludes to the sky, the primary theater of Air Force operations. Yellow refers to the sun and the excellence required of Air Force personnel. The winged eye reflects the unit's heritage. The two orbiting pole stars depict the active duty and reserve components supported by the Wing. The globe symbolizes the global nature of the Wing's mission.

Motto: "Persistent Global Surveillance"

Table of Contents

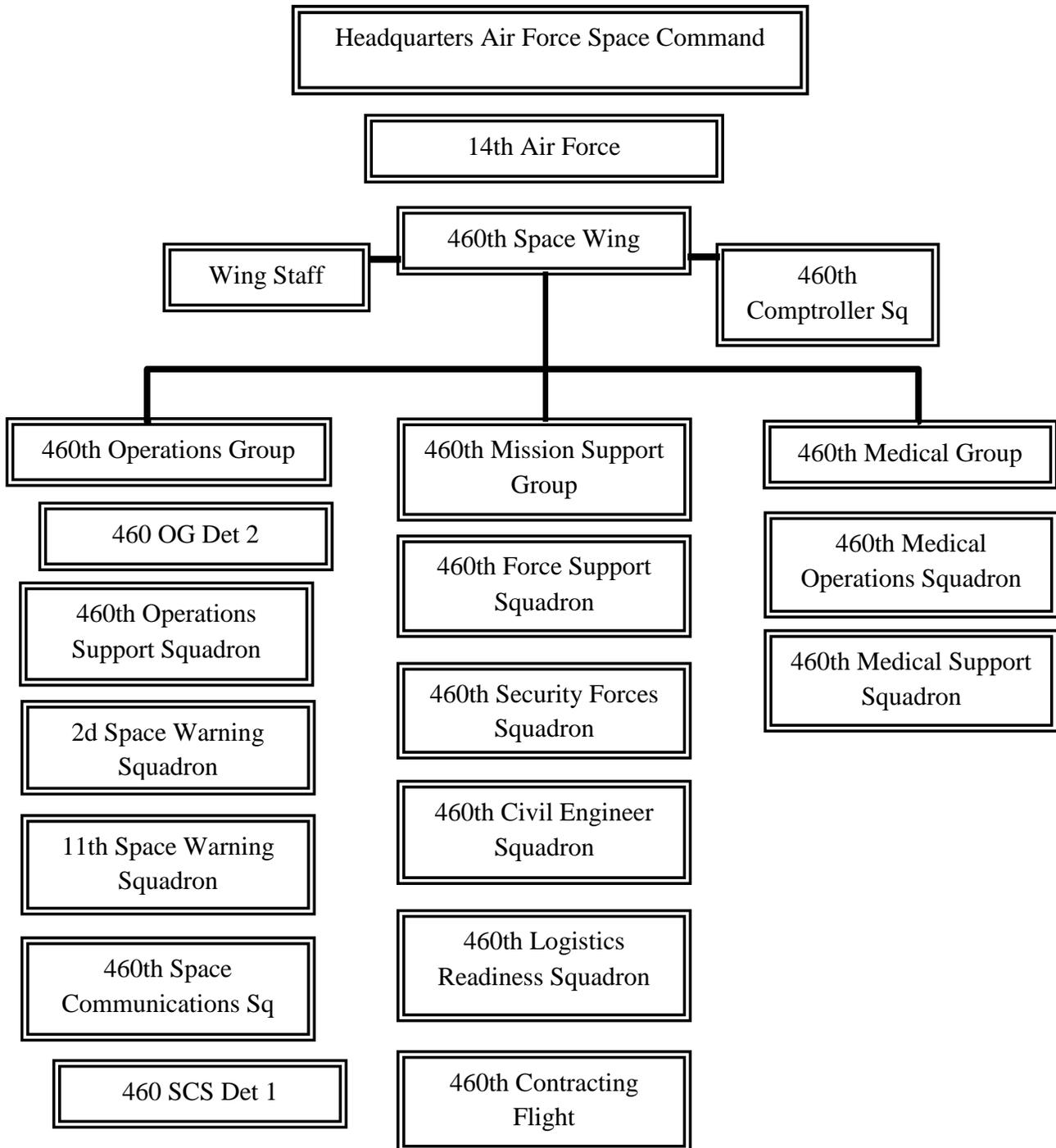
Frontispiece	iii
Table of Contents	iv
List of Illustrations	v
Wing Organization	vii
Wing Chronology	viii
460th Space Wing History	1
Buckley Air Force Base History	10
Honors	21
Assigned Aircraft/Space Systems	23
Stations	24
Commanders	25
Space System Fact Sheets	26
Bibliography	32

List of Illustrations

460 BG personnel loading 100lb practice bombs, Chatham Army Air Field, Georgia, 30 December 1943.	1
460th Bombardment Group logo.	1
460 BG aircraft drops their bombs.	3
Flak over Vienna, 10 September 1944.	3
Emblem of the 460th Tactical Reconnaissance Wing.	4
RF-101 Voodoo at Tan Son Nhut Air Base.	5
Crew removes film from an R-F4C Phantom following a mission over North Vietnam, 1967.	5
EC-47s on the flight line at Pleiku Air Base, South Vietnam.	6
Unofficial “Antique Airlines” patch.	6
460th Tactical Reconnaissance Group emblem.	8
SSgt James R. McManus and CMSgt Randy Edwards “case” the flag of the 821st Space Group during its inactivation ceremony and transfer of host installation responsibilities to the 460th Air Base Wing, 1 October 2001.	9
Postcard for Buckley Field, 1942.	10
1Lt John Harold Buckley.	11
Buckley Field during World War II.	11
Armament training at Buckley Field.	11
One of the Veterans Villages at Naval Air Station-Denver.	12
Construction of Hangar 801, 1953.	12
F-86 Minute Man plane.	13
Minute Men perform a “corkscrew” maneuver.	13
Minute Man team, circa 1956.	13
Colonel John P. Proctor, 451st Strategic Missile Wing Commander, stands in front of a Titan I rocket.	14
Crewman in one of the 451st Strategic Missile Wing missile control centers. On the wall are drawings of the other control centers.	14
COANG maintainers prepare to load 20mm rounds into an F-100, 1960s.	15
120th Fighter Squadron A-7s fly over the 6th Ave. Gate at Buckley ANGB, ca. mid-1970s.	15

Construction of the DSP complex, looking northwest, May 1971.	16
The first DSP satellite, 1970.	16
Buckley AFB front gate at 6th Avenue, 2001.	17
460 SW headquarters, July 2005.	18
Fitness Center basketball court, April 2004.	18
The Mission Control Station, early 2000s.	18
Panther Hall enlisted dormitory, April 2004	18
Buckley Air Force Base, 2009.	20

Wing Organization



Chronology

<i>460th Space Wing History</i>	
19 May 1943	The 460th Bombardment Group (Heavy) is established.
1 July 1943	The 460th Bombardment Group (Heavy) is activated.
1 July 1943	Assigned to Alamogordo Army Airfield, New Mexico
31 August 1943	Assigned to Kearns Army Airfield, Utah
29 October 1943	Assigned to Chatham Army Airfield, Georgia
4 January 1944	Assigned to Camp Patrick Henry, Virginia
11 February 1944	Assigned to Spinazzola Air Base, Italy
26 July 1944	Awarded the Distinguished Unit Citation, WWII-Austria
15 June 1945	Assigned to Waller Field, Trinidad to assist with the movement of troops from Europe to the United States
30 June 1945	Assigned to Paramirim Field, Brazil to assist with the movement of troops from Europe to the United States
26 September 1945	460th Bombardment Group (Heavy) inactivated
2 February 1966	460th Tactical Reconnaissance Wing (TRW) established and activated for Vietnam War
18 February 1966	The 460 TRW is assigned to Tan Son Nhut AB, South Vietnam
31 August 1971	The 460 TRW inactivates.
19 September 1989	460th Tactical Reconnaissance Group (TRG) is activated and assigned to Taegu AB, Republic of Korea.
1 October 1990	The 460 TRG is inactivated.
1 October 2001	The 460th Air Base Wing (ABW) is activated to assume installation host and base support responsibilities for Buckley AFB. The satellite missile-warning mission remains under the authority of the 21st Space Wing at Peterson AFB, Colorado.
19 August 2004	The 460 ABW is redesignated as the 460th Space Wing. This consolidates the missile-warning and base support missions under one organization at Buckley AFB.
November 2006	The SBIRS first Highly Elliptical Orbit payload, HEO-1, achieves operational status.
11 November 2007	DSP-23 launches as the final satellite to serve the DSP constellation.
June 2008	The HEO-2 payload achieves operational status.
7 May 2011	The SBIRS first Geosynchronous Orbit satellite, GEO-1, is launched.
19 March 2013	GEO-2 is launched.
17 May 2013	GEO-1 achieves operational acceptance.
25 November 2013	GEO-2 achieves operational acceptance.
11 May 2015	The HEO-3 payload successfully completes its on-orbit checkout.
13 Dec 2016	The SBIRS Block 10 phase achieves operational acceptance.

Buckley Air Force Base History

January 1938	The City of Denver purchases the first land parcel for a planned 64,000-acre auxiliary bombing range and ammunition depot for Lowry Army Air Field, Colorado.
14 June 1941	The War Department officially designates Lowry's auxiliary range, initially known simply as Lowry II, as Buckley Field in honor of Longmont veteran 1Lt. John Harold Buckley.
April 1942	5,470 acres of land is set aside to house an Army Air Corps Technological School for armament training.
1 July 1942	Buckley Field's training school officially activates.
July 1946	Buckley Field officially inactivates, but remains training site for Colorado Air National Guard (COANG)
November 1946	The US Navy announces that it will assume authority as the installation host of Buckley in 1947 as a Reserve station. They begin transferring establishing operations there in December.
28 September 1947	Site formally transferred to the Department of the Navy, renamed Naval Air Station-Denver (NAS-D).
July 1953	COANG units assigned to NAS-D are the first to acquire jet aircraft.
November 1953	"Minute Men" from NAS-D are the first Air National Guard precision flying team.
October 1956	National Guard Bureau designated "Minute Men" the official Air National Guard demonstration team.
30 June 1959	"Minute Men" disbanded
18 April 1960	The Air Force officially designates the base as Buckley Air National Guard Base (ANGB), the first stand-alone guard base in the nation
1 July 1966	Flying operations at Lowry AFB end and all transient aircraft become the responsibility of Buckley ANGB.
30 April 1968	Units from Buckley ANGB become the first guard units sent to a combat zone since WWII.
Spring 1969	Construction begins on the Aerospace Data Facility-Colorado, then known as the CONUS Ground Station.
6 November 1970	The first DSP missile-warning satellite is launched.
1 July 1971	The 2d Communications Squadron is activated to operate the DSP satellite constellation from Buckley ANGB.
September 1981	The 140th Tactical Fighter Wing wins the air-to-ground attack "Gunsmoke" contest at Nellis AFB, Nevada.
December 1985	Buckley ANGB hosts the nuclear, biological, and chemical center operations course, the first time the course is held outside of Europe
15 May 1992	The 2d Space Communications Squadron activates and assumes the mission of the 2 CS, which is reassigned to the 2d Bomb Wing. It's redesignated the 2d Space Warning Squadron a year later.
31 May 1996	The 821st Space Group activates as a tenant unit at Buckley ANGB to oversee the space-based missile warning mission, as well a support, operations, and security functions.
1 October 2000	The Air Force assumes responsibility for Buckley ANGB and activates

	Buckley Air Force Base, with the 821 SG serving as the installation host. Buckley AFB is the first newly designated Air Force base since 1988, when Falcon Air Force Station (now Schriever AFB) was renamed Falcon AFB.
29 May 2001	The 821 SG transfers operational and strategic communication mission authority to the 21st Operations Group at Peterson AFB, Colorado, and inactivates on 1 October 2001. These functions are retained at Buckley AFB and continue following the activation of the 460 SW in August 2004.
18 December 2001	The Mission Control Station is declared operational by Air Force Space Command.

460th Space Wing History

Headquartered at Buckley Air Force Base (AFB), Colorado, the 460th Space Wing (SW) serves as the critical link in the United States' network of space-based missile warning and infrared detection satellite operations. The Wing provides combatant commanders with worldwide missile warning and global situational awareness, supports air expeditionary and war fighter needs for the US Air Force and cross-service organizations assigned to Buckley AFB, and provides mission support to over 80 partner units both on and off base.

The 460 SW currently employs approximately 1,250 active duty and civilian personnel, and operates three different space-based satellite constellations—the Defense Support Program (DSP), which dates back to the 1970s, and the Space-Based Infrared Systems (SBIRS), which consists of geosynchronous satellites and highly elliptical satellite payloads. SBIRS has been in development since the mid-2000s and began its first operational activity in 2013. The Wing also provides personnel in support of worldwide contingency operations.

460th Bombardment Group



460 BG personnel loading 100lb practice bombs, Chatham Army Air Field, Georgia, 30 December 1943.



460th Bombardment Group logo.

The 460 SW enjoys a prestigious lineage that includes service in both World War II and the Vietnam conflict, beginning life as the 460th Bombardment Group (BG) (Heavy) in 1943. Second Air Force established the Group on 19 May 1943 and officially activated it on 1 July 1943 at Alamogordo Army Air Field, New Mexico (now Holloman Air Force Base). Their first listed commander was Colonel Robert T. Crowder, who assumed command on 12 August 1943. In the fall of 1943, Colonel Crowder opened a contest to submit the group's patch logo; the design of a stalking black panther by Victor Newburg, Jr., was the winner out of only two

entries. The group completed its training in the final week of December 1943, following stints at Alamogordo, Chatham Army Airfield in Georgia, and Camp Patrick Henry in Virginia.

Following training, the 460 BG received 62 “fly-away” B-24H models, equipped with 10 .50-caliber machine guns and capable of carrying up to 8,000 pounds of bombs. Skeleton crews flew the planes to Oudna I airfield near Tunis until the remaining 460th members could be transported to Italy by ship. The first members arrived at port in Taranto on 8 February 1944, and by 18 February most of the ground crews arrived in Spinnazola. The Group was first assigned to the 49th Bombardment Wing (BW) but because the latter’s headquarters in Torreto was not complete when the 460 BG arrived, the Group was reassigned to the 55 BW.

During ferry operations from Oudna, the 460th saw its first casualties when bad weather forced the crew under Norman Corey into the side of a hill near Acerenza, Italy. The aircraft crashed directly into another hill 250 yards ahead, killing most of the crew members and passengers. Homer Koch was posthumously awarded the Soldier’s Medal for pulling crew chief Wesley Kuoska to safety from the burning wreckage, before succumbing to his own wounds at a hospital in Bari. Another plane under the command of Lloyd Hansen crashed near Potenza, killing all aboard, and was not found until the springtime.

Life at Spinnazola was initially quite Spartan. The troops lived in tents with no means to heat them, slept on damp ground, and didn’t even possess an indoor mess hall or kitchen. To add insult to injury, Mt. Vesuvius experienced a small eruption on 23 March, mixing ash and snow into the food. Group commanders set up headquarters in a two story villa south of the 6000-foot runway, and construction on base facilities quickly began. Existing buildings in the area were converted for military use, including the renovation of a barn into a movie theater that contributed greatly to unit morale.

The 460 BG underwent their first combat mission on 19 March 1944 against the marshalling yards and docks at Metkovic, Yugoslavia. Through the first weeks, Colonel Crowder insisted on flying every mission in order to learn through experience what the mission commanders could expect to encounter. This proved deadly on 15 April when his plane was shot down by a German Me-109 during an attack on the marshaling yards in Bucharest, Romania. Colonel Bertram C. Harrison, the deputy commander since 27 September 1943, immediately assumed command of the 460 BG.

During its time in Italy, the 460 BG conducted attacks against targets in a variety of locations including Germany, Austria, Greece, Italy, Romania, Czechoslovakia, and Yugoslavia.

Prior to his death, Colonel Crowder insisted on maintaining extremely tight flying formations in order to provide the maximum amount of covering fire from the guns of the B-24s. This directive became noteworthy during an attack on the Zwolfaxing Airdrome in Austria on 25 July 1944, led by Colonel Harrison. As the formation approached the bomb run, it came under fire from approximately 30 Me-109 fighters and two FW-190s. The curtain of counterfire from the bombers forced the Germans to break off their attack 600 yards from the target. On 8 November, the 460 BG was presented with a Distinguished Unit Citation for its actions during this attack, and Colonel Harrison received the Silver Star.



460 BG aircraft drops their bombs.



Flak over Vienna, 10 September 1944.

By V-E Day on 8 May 1945, the 460 BG's mission load decreased considerably as the German war machine ground to a halt. Prior to the Group's final departure from Spinnazola on 6 June, most of the ground contingent debarked at Naples to travel to Waller Field, Trinidad; the rest of the Group joined them by 15 June. The 460 BG then redeployed from Waller Field to Natal, Brazil on 30 June. Air Transport Command, which gained control of the organization after its arrival in Trinidad, inactivated the 460 BG on 26 September 1945.

Two memorial plaques to the 460 BG exist at the Air Force Museum at Wright-Patterson AFB, Ohio and the US Air Force Academy, Colorado Springs, Colorado. The Group had 253 B-24s assigned to it in total during its time in Italy, of which 130 were lost for various reasons, ranging from combat losses to mechanical failures to crash landings. 305 men were killed in action, and another 13 died in accidents or from unknown causes.

460th Tactical Reconnaissance Wing

On 18 February 1966 the 460th Bombardment Group reactivated as the 460th Tactical Reconnaissance Wing (TRW) and entered the Vietnam Conflict. Its headquarters shared Tan

Son Nhut Air Base, just north of Saigon, South Vietnam, with 7th Air Force Headquarters and the Military Assistance Command Vietnam (MACV).



Emblem of the 460th Tactical Reconnaissance Wing.

At the time of its activation, the 460 TRW became responsible for the entire reconnaissance mission, both visual and electronic, throughout the Southeast Asia (SEA) area of responsibility. When the 460 TRW stood up, it gained several flying units—the 16th Tactical Reconnaissance Squadron (TRS), 20 TRS, 41 TRS, and Detachment 1 of the 460 TRW. Both the 20 TRS and 41 TRS operated from bases in Thailand—Udon Air Base and Takhli Royal Thai AFB, respectively. Collectively, the Wing possessed over 200 aircraft of varying types by the end of June.

The 20th Tactical Reconnaissance Squadron (TRS) flew the RF-101 *Voodoo* for the 460 TRW. RF-101s provided visual and photographic information on disposition, movement, and activity of both friendly and hostile forces. On 8 July 1966, Detachment 1 of the 45th Tactical Reconnaissance Squadron arrived at Tan Son Nhut Air Base and increased the 460 TRW's contingent of RF-101s. Unusually, the squadron's assets operated in SEA while it maintained a team of one officer and one enlisted airman at the squadron's home station of Misawa AB, Japan.

The 16th Tactical Reconnaissance Squadron operated the RF-4C *Phantom II*. These aircraft reinforced the RF-101 *Voodoos* then in service, and featured a lengthened nose section to accommodate its cameras, mapping radar, and infrared imaging equipment. On 9 September 1966 the Wing received additional *Phantom II* squadrons: the 6461st Tactical Reconnaissance Squadron based in Thailand, and 12th Tactical Reconnaissance Squadron, at Tan Son Nhut Air Base.



RF-101 Voodoo at Tan Son Nhut Air Base.



Crew removes film from an R-F4C Phantom following a mission over North Vietnam, 1967.

The 460 TRW's overall mission encompassed visual reconnaissance and electronic warfare. The 41 TRS flew the RB-66C *Destroyer* to handle the latter. On 8 June 1966, the 460 TRW gained another RB-66 squadron, the 6460 TRS. Their primary role was to identify enemy radar sites in North Vietnam that controlled anti-aircraft missile and gun sites so other aircraft could avoid those areas.

Detachment 1 of the 460 TRW activated at the same time as the Wing. For a short time it served a multifunctional role and flew a variety of aircraft that included RB-57 *Canberras*, T-39A *Sabreliners*, the VC-123B *White Whale*, and Cessna U-3B courier missions. The *White Whale* served as the VIP transport for General William Westmoreland, commander of US forces in South Vietnam. It also participated in several distinct missions: "Patricia Lynn," "Hawkeye," "Phyllis Ann," and "Drillpress."

460 TRW Det used the RB-57s for the "Patricia Lynn" missions. This aircraft had a lengthened nose to accommodate a 36-inch forward oblique camera, a panoramic camera that could be loaded with infrared film for night missions, and infrared sensing equipment. On a typical "Patricia Lynn" mission the RB-57s accompanied strike aircraft to a target and completed post-attack damage assessments of the target area.

Project "Hawkeye" came about as a safer way to conduct radio direction finding (RDF), which targeted Viet Cong radio transmitters. Before this program, RDF teams conducted ground-tracking of these signals, which exposed them to ambushes. In response, the USAF modified several World War II-era C-47 *Skytrains* to accomplish airborne RDF. Project "Phyllis Ann" also used modified C-47s for much the same purpose, although those aircraft

contained more advanced navigational and reconnaissance equipment. Due to security concerns, “Phyllis Ann” underwent several name changes before ending under the moniker “Commando Forge.” Project “Drillpress” employed modified C-47s to collect intelligence from North Vietnamese broadcasts. This data provided intelligence on plans and strategy of the Viet Cong North Vietnamese military. About 95 percent of the B-52 strikes conducted in Vietnam were based, at least partially, on data from “Hawkeye,” “Phyllis Ann,” and “Drillpress” missions.

The 360th Reconnaissance Squadron (RS) at Tan Son Nhut Air Base, and the 361st Reconnaissance Squadron Nha Trang Air Base, South Vietnam handled the “Hawkeye,” “Phyllis Ann,” and “Drillpress” missions beginning on 8 April 1966. A third squadron, the 362d Reconnaissance Squadron, activated at Pleiku Air Base, South Vietnam on 1 February 1967. These squadrons eventually redesignated to become Tactical Electronic Warfare Squadrons (TEWS). In April 1969 the 460 TRW stood up an additional detachment to fly EC-47s. This started out as 460 TRW Det 2, but on 1 June 1969 the unit transferred to become 360 TEWS Det 1. Because these squadrons all flew the modified C-47s, and many of the assigned Airmen had experience as WWII veterans, they affably dubbed their units as “Antique Airlines.” Detachments of these squadrons operated from several locations, including bases in Thailand. Each of the main squadrons and their detachments moved at least once due to operational and/or security reasons. Personnel from the 6994th Security Squadron operated the RDF and signal intelligence equipment in the back of the modified EC-47s.



EC-47s on the flight line at Pleiku Air Base, South Vietnam.



Unofficial “Antique Airlines” patch.

In the autumn of 1966, the 460 TRW and its responsibilities changed. On 18 September, the 432d Tactical Reconnaissance Wing activated at Takhli Royal Thai AFB and assumed control of the reconnaissance squadrons in Thailand, decreasing the 460 TRW’s responsibility

for all air reconnaissance missions throughout Southeast Asia. The 460 TRW provided the 432 TRW with continued support in recovering RF-101 and RF-4C aircraft returning from high priority, high interest target missions, and later assumed host wing responsibilities for Tan Son Nhut Air Base on 15 October.

While active in South Vietnam, in addition to its primary mission, the 460 TRW took part in several operations in both a direct and support capacity. During their time in SEA both the 12 TRS and 16 TRS supported Operation “Arc Lite” by flying bomb damage assessment missions. “Arc Lite” missions, at first, involved saturation bombing from B-52 *Stratofortresses* over Viet Cong base areas. Later the B-52s provided direct tactical bombing support of friendly forces. Additionally, these two squadrons flew Operation “Search” missions that located targets for “Arc Lite.”

To help military leaders at all levels better understand the topography of sections of the DMZ and Laos, on 20 October 1967, the RF-101s of 45 TRS Det 1 began flying aerial mapping missions as part of Project “Muscle Shoals.” This program incorporated into Project “Igloo White” in June 1968, which also included ground sensors and electronic warfare aircraft as well as the RF-101s. “Igloo White” missions began during the Battle of Khe Sanh in January 1968 and continued until the end of American military involvement in the conflict. Also during Khe Sanh, the 460 TRW became part of Operation “Niagara,” locating enemy troops and equipment surrounding the area in preparation for tactical bombing strikes.

Because of the concern about anti-aircraft proliferation sites around target areas in North Vietnam, US military and civilian leadership decided to add them to the “Rolling Thunder” bombing operation that began on 2 March 1965. Eventually, attacking these sites became a stand-alone operation called “Ironhand.” Initially, attack aircraft used intelligence photos to designate targets. This proved only partially successful because anti-aircraft crews could relocate the sites within a few hours. On 20 June 1969, RF-101s from the 45 TRS Det 1 began flying missions with F-4E *Phantom IIs* or F-105 *Thunderchiefs* to provide on-site visual intelligence for immediate strikes, which provided a great morale boost for Det 1’s pilots. Det 1 inactivated on 16 November 1970 and its aircraft transferred to the Mississippi Air National Guard. This left the 460 TRW’s EC-47s, RF-4Cs, and RB-57s as the only reconnaissance aircraft operating from bases in Vietnam.

Being one of two reconnaissance wings supporting SEA there were few military operations that did not involve the 460 TRW, and the preceding narrative describes just a handful of the more notable ones. Towards the end of its time as an active unit, in May 1971 Vietnamese

crews began flying with EC-47 crews from the 360 TEWS and 6994 SS to get training on operating the aircraft and its systems. The 460 TRW finally inactivated on 31 August 1971. During its time as an active organization, the Wing earned four Presidential Unit Citations and two outstanding unit awards.

460th Tactical Reconnaissance Group

On 19 September 1989, the Air Force redesignated the 460 TRW as the 460th Tactical Reconnaissance Group (TRG) and reactivated it on 1 October 1989 at Taegu Air Base, South Korea under 7th Air Force. Behind this activation was Pacific Air Force Command's (PACAF) portion of Phase II of an Air Staff programming plan called "Commando Flash." The 460 TRG trained RF-4C crews for reconnaissance missions in the event of an invasion by North Korea. After a year the 460 TRG inactivated on 1 October 1990, although two of the Group's subordinate units briefly remained active until 15 October 1990 and 1 July 1991, respectively.



460th Tactical Reconnaissance Group emblem.

460th Space Wing

On 31 May 1996, the 821st Space Group (SG), assigned to the 21 SW at Peterson AFB, activated as a tenant unit at Buckley Air National Guard Base (ANGB). The Group assumed the responsibility to operate the Defense Support Program (DSP) constellation, manage a portion of the AFSPC space communications data processing and relay mission, serve as a nucleus for the Space-Based Infrared System (SBIRS) then in development, and to administer the area support mission. The Group acquired new logistics, support, medical, operations, and security police squadrons, as well as the 3rd Space Communications Squadron, 5th Space Warning Squadron (SWS), and 11 SWS. On 29 May 2000, in preparation for the transition of Buckley ANGB to Buckley AFB, the 821 SG transferred operational and strategic communications missions to the 21st Operations Group (OG) at Peterson AFB, consolidating all the squadrons running them became geographically separated units under the 21 OG. The 821 SG inactivated and the 460th Air Base Wing (ABW) activated on 1 October 2000, the same day as the redesignation of

Buckley to an Air Force Base. The 460 ABW assumed installation host responsibilities to provide mission support for the base's tenant units, personnel family members, and the local retirement community.



SSgt James R. McManus and CMSgt Randy Edwards “case” the flag of the 821st Space Group during its inactivation ceremony and transfer of host installation responsibilities to the 460th Air Base Wing, 1 October 2001.

In September 2002, the 460th Support Group was redesignated the 460th Mission Support Group, and both the 460th Logistics Readiness Squadron and the 460th Contracting Squadron were activated. The mission continued to grow and evolve, and the Wing activated the 460th Comptroller Squadron in July 2004 to directly support Buckley AFB's finance needs. Buckley's medical needs were initially met the by the 460th Medical Squadron, but the base's growth quickly outstripped the squadron's support capabilities and it was replaced by the 460th Medical Group on 21 September 2005, followed by the Medical Operations and Support Squadrons in October 2007.

On 19 August 2004, as part of Air Force Space Command's (AFSPC) efforts to meet base realignment and consolidation mandates and focus on emerging systems and new technologies, it redesignated the 460 ABW as the 460th Space Wing (SW). The 460 SW retained the base support mission at Buckley AFB; incorporated the 2nd Space Warning Squadron and its Air Force Reserve counterpart, the 8 SWS; added the 460th Operations Group and the 460th Operations Support Squadron; and redesignated the 460th Communications Squadron as the 460th Space Communications Squadron. This reorganization enabled them to assume the 21 SW's missile warning satellite operations mission and take responsibility for the Mission Control Station (MCS) on base, the DSP satellite constellation, and the SBIRS program.

Buckley Air Force Base History

Buckley Air Force Base has a rich and storied history to match that of its host wing. Established just prior to the entry of the United States into World War II, the base has served the needs of all branches of the U.S. Armed Forces for 75 years.

Buckley Field



Postcard for Buckley Field, 1942.

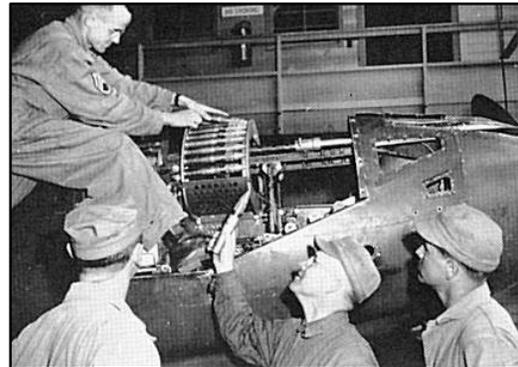
In 1938, the City of Denver donated over 65,000 acres of land southeast of the city to the War Department for use as a bombing range, auxiliary landing field and ammunition depot for the newly-activated Lowry Field. The area was briefly called the Demolition Bombing Range—Lowry Auxiliary Field, or colloquially as Lowry II. Denver acquired this land through a series of purchases for the specific purpose of providing Lowry with a bombing range close to the base, as the Army Air Corps required training sites to implement the doctrine of strategic bombing that it had adopted. On 14 June 1941 the site was named Buckley Field in honor of 1Lt John Harold “Buck” Buckley, a World War I pilot from Longmont, Colorado. Born 8 July 1895 and the grandson of one of Longmont’s founders, Lt Buckley was assigned to the 28th Aero Squadron in France. He perished on 27 September 1918 during the third day of the Argonne Offensive, when his aircraft collided with another on takeoff prior to a dawn patrol.



1Lt John Harold Buckley.



Buckley Field during World War II.



Armament training at Buckley Field.

Due to US support of the Allies in World War II, the government expected that actual involvement in the conflict would soon take place and initiated a military buildup across the country, including the expansion of training sites. The War Department determined that Lowry II could be put to better use as an Army Air Corps Technical School to facilitate the training of an additional 55,000 troops a year. Construction contracts were awarded for the site in April 1942 and construction began the following month.

When Buckley Field opened as a training base, it featured 700 buildings and structures, 10 water wells, a water distribution system, sewage collection and treatment system, a coal-fired steam heating plant, electrical plant, and a communications system; as well as streets, two runways, and 16,000 feet of railroad track. The school opened on 1 July 1942, and operated as a technical training school for aircraft fighter armorers, while Lowry trained armorers for bombers. In the next year, the base quickly grew to include basic training for enlistees and aviation cadets, chemical warfare, and arctic survival skills, with associated training sites at the bombing range as well as Echo Lake, located 15 miles from the summit of Mount Evans. For such a relatively

small installation, the base was extraordinarily busy—during one six-month period in 1943, Buckley’s programs saw the graduation of 27,000 armorers and 9,500 basic trainees. Following the end of the war in August 1945, Buckley’s future fell into limbo, and in June 1946, Army Air Force Technical Training Command announced the base’s transition to inactive status. Concurrent with this, the newly formed Colorado Air National Guard (COANG) began migrating to the field to set up operations, and acquired a right-of-entry permit in December 1946.

Naval Air Station-Denver

In mid-1946, the Department of the Navy required a site for an inland Naval Air Reserve Station to serve as a mid-country refueling stop for its aircraft, as well as a facility to meet the training needs of Naval Reserve sailors in New Mexico, Colorado, Wyoming, Utah, and parts of the Dakotas and Nebraska. The Navy investigated airfields in Utah, Colorado, and Wyoming, and Buckley Field’s centralized location quickly placed it at the top of the list. Its appeal increased thanks to over 800 ex-Navy personnel in the Denver area who expressed an interest in joining the Naval Air Reserve. While the COANG remained on site, the Department of the Navy assigned its first personnel to Buckley in December 1946. It formally assumed control of Buckley Field in September 1947 and renamed it Naval Air Station-Denver (NAS-D).

NAS-D quickly became known throughout the Navy as the “world’s highest NAS” and the “NAS farthest from a body of water.” In addition, five Veteran’s Villages existed from 1947-53 to help ease the post-war housing shortage caused by wartime construction restrictions. Construction crews remodeled excess WWII-era buildings into temporary housing for veterans and their families, named Buchtel Village, Pioneer Village, North Denver Village, Fort Logan Village, and Buckley Field Village. Each village had its own governing body, mayor, and even their own newspaper.



A Veterans Village at Naval Air Station-Denver.



Construction of Hangar 801, 1953.

The COANG's 86th Fighter Wing (FW) remained at NAS-D following the transfer of authority to the Navy, first flying P-51 *Mustangs* and transitioning to the F-80 *Shooting Star* in 1953, all operated by the 120th Fighter Squadron. The 86 FW was inactivated on 31 October 1950 and the responsibility for COANG personnel at NAS-D transferred to the 140th Fighter Wing. The 140 FW underwent several redesignations during the 1950s due to changing mission responsibilities and active-duty service in the Korean War. In November 1953, the wing activated an aerial demonstration team known as the Minute Men, which first existed as a three-man P-51 team from 1947-50. The re-activated four-man team flew at many air shows and other local events prior to their official designation as the ANG's aerial demonstration team from October 1956 to June 1959. Flying first the F-80 and then the F-86E *Sabre*, the Minute Men were known for their distinctive red-and-silver paint scheme.



F-86 Minute Man plane.



Minute Men perform a "corkscrew" maneuver.



Minute Man team, circa 1956.

NAS-D remained active until June 1959 when the Department of the Navy, seeking to trim its post-war budget, elected to close thirty Air Reserve stations, including NAS-D. Units assigned to the station either disbanded or transferred elsewhere. Likewise, NAS-D personnel either opted for an early discharge or affiliated with other units. On 18 April 1960, after twelve years of ownership, the Navy transferred NAS-D to the Department of the Air Force. The Air Force in turn licensed the land to the State of Colorado for use as an Air National Guard training site. The site was renamed Buckley Air National Guard Base (ANGB) and became the first stand-alone guard base in the Air Force. Despite the changes, a Navy presence remained at Buckley, first as a Naval Air Reserve Center and currently as Navy Operational Support Center-Denver and Naval Information Operations Command-Colorado.

Buckley Air National Guard Base

Following the activation of Buckley as an Air National Guard base, the 140th Air Defense Wing assumed the responsibilities of installation host. The wing's F-86s were traded out for F-100 *Super Sabres*, the first supersonic fighter jet, beginning in 1961. Buckley's flight line took on even greater importance when civilian developmental encroachment compelled the Air Force to shut down all flying operations at Lowry AFB in July 1966, making Buckley ANGB the lone stop for all transient military aircraft in the Denver metropolitan area. Interestingly, the runway at Buckley was—and remains—the only military runway equipped with a forward arresting system and the only airfield licensed to operate tactical aircraft loaded with munitions within a 410-mile radius of Denver.

During the early 1960s, the base provided site support of four Titan I intercontinental ballistic missile silos located on the former Lowry bombing range. Construction of these 30-60 acre sites took place from 1958-61, and the Air Force activated the 451st Strategic Missile Wing at Lowry AFB in July 1961 to run them. Two other sites were located near the cities of Deer Trail and Elizabeth. The replacement of the Titan I with Titan II and Minuteman missiles led to the deactivation and closure of the silo complexes by the end of 1965.



Colonel John P. Proctor, 451st Strategic Missile Wing Commander, stands in front of a Titan I rocket.



Crewman in one of the 451st Strategic Missile Wing missile control centers. On the wall are drawings of the other control centers.



COANG maintainers prepare to load 20mm rounds into an F-100, 1960s.



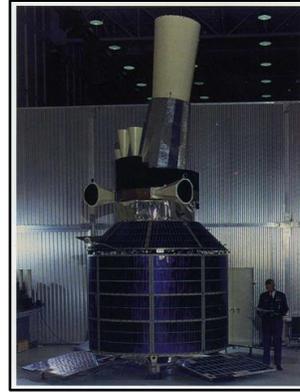
120th Fighter Squadron A-7s fly over the 6th Ave. Gate at Buckley ANGB, ca. mid-1970s.

The COANG spent the next 40 years serving as a judicious and at times extremely busy installation host for Buckley. The 140th Air Defense Wing transitioned to a fully-fledged fighter operation, first as the 140th Tactical Fighter Wing (TFW) in 1961, then the 140th Fighter Wing (FW) in 1992, and finally the 140th Wing (WG) in 1995. In addition to countless temporary training assignments, in April 1968 the 140 TFW became the first Air National Guard unit to be sent to a combat zone since World War II when it activated for a deployment to Phan Rang Air Base in Vietnam through April 1969. Over the decades, the wing also transitioned from F-100s to the A-7 *Corsair II* in 1973, and then to the F-16 *Fighting Falcon* in 1992. One of its most notable achievements took place in 1981 when the Wing took top honors at the “Gunsmoke” air-to-ground gunnery competition between active-duty, ANG, and Air Reserve units.

In the spring of 1969, the Air Force began construction of a highly classified facility for the purpose of hosting the ground station for a new space-based missile warning system known as the Defense Support Program (DSP). Buckley had been an important link in the nation’s early warning network beginning in 1957 with the establishment of a radar detection site administered by the 138th Air Control and Warning Squadron. The new complex, which became known publically as the Aerospace Data Facility (ADF) and under DSP as the Continental United States (CONUS) Ground Station, in 1971 became the US-based operational nerve center for a new system of missile warning satellites that first launched in November 1970. A total of 23 satellites for the constellation launched through November 2007, providing space operators with 24-hour data on ballistic missile launches and atmospheric explosions.



Construction of the DSP complex, looking northwest, May 1971.



The first DSP satellite, 1970.

The construction of the ADF and DSP operations center brought one of Aurora's most visible landmarks—the white geodesic radomes that house the communications relay dishes which send and receive data to the satellite constellations. These distinct buildings came to be called “the giant golf balls” by Denver-area residents. For over 25 years, operations in this facility remained classified to such a degree that operators often wouldn't even admit that the radomes existed. Finally, in November 1996 Buckley officials opened the radomes to the press for a public relations tour. This became the first step in opening up the base's missile-warning mission to the public. In December 2001, 30 years after the DSP ground station sent out its first official message, a new Mission Control Station activated at Buckley for the purpose of consolidating ground operations for DSP and the new Space-Based Infrared System (SBIRS), a constellation of geosynchronous satellites and elliptical orbit sensors.

By 1988, Buckley ANGB included three separate land holdings totaling 3,250 acres and an airfield with two 150-foot wide runways that were 8,000 and 11,000 feet long respectively. After Congressional Base Realignment and Closure (BRAC) Committees directed closure of Lowry AFB in 1991 and Fitzsimons Army Medical Center in 1995, military organizations and retirees remained in the area with virtually no support. As several missions formerly supported by Lowry AFB remained in the area, the Air Force directed Air Force Space Command (AFSPC) to act as the support agent for all active military members remaining in the Denver area.

AFSPC tasked the 2d Space Warning Squadron (SWS), then assigned to the 21st Space Wing (SW) and stationed at Buckley ANGB, with this responsibility until a permanent solution could be found. AFSPC, the 21 SW, and Air Staff worked through the summer and fall of 1995 to develop possible solutions and ultimately agreed to combine two plans into Programming Plan 95-15. This document called for the activation of a new group at Buckley ANGB to manage the support needs of the area and consolidate the space warning mission of the 21 SW. The 821st

Space Group activated on 31 May 1996 for this purpose.

Buckley Air Force Base

Over the next four years the space mission, and with it, the active duty population of Buckley ANGB, grew considerably. While the 140 WG, as host of the base, supported the 821 SG's mission expansion, this growth made it increasingly difficult for them to provide operating support for Buckley's expanding list of tenants and mission partners. By 2000, reductions in manpower and budgets made this support virtually impossible, prompting the Governor of Colorado, Bill Owens, to ask the Secretary of the Air Force for assistance. As relocating the space and support missions under the 821 SG to Peterson AFB proved impractical, the Secretary of the Air Force F. Whitten Peters converted Buckley ANGB to Buckley Air Force Base on 1 October 2000, thereby activating the first new Air Force base in 19 years. Secretary Peters directed AFSPC to assume control of the new base with the 821 SG serving as host.



Buckley AFB front gate at 6th Avenue, 2001.

The 21 SW became responsible to support an additional twenty tenant units and over 88,000 personnel, a task that quickly proved inadequate for the wing's own resources. To balance the mission workload and provide adequate support to the Denver area, AFSPC inactivated the 821 SG and activated the 460th Air Base Wing (ABW) on 1 October 2001 to serve as the installation host and provide base support functions, while all space operation responsibilities remained under the 21 SW.

Up through the mid-1990s, save for the classified ADF and DSP facilities, nearly all the functions at Buckley took place inside buildings that dated to World War II and the 1950s, which grew increasingly decrepit and incapable of properly supporting the growing base population. A newly designated Air Force base meant a need for up-to-date facilities to support the evolving missile warning mission, and increased host and tenant support requirements. The first decade of Buckley's life as an Air Force Base saw the initiation of numerous construction projects. These

included a new headquarters building, Fitness Center, Commissary and Base Exchange, enlisted service member dormitories, privatized base housing, base chapel, and Child Development Centers, all of which increased the quality of life for Team Buckley members.



460 SW headquarters, July 2005.



Fitness Center basketball court, April 2004.



The Mission Control Station, early 2000s.



Panther Hall enlisted dormitory, April 2004.

The consolidation of all DSP operations into the MCS and the activation of the facility in December 2001 was known as SBIRS Increment One. This was the critical first step in incorporating the remaining active DSP satellites with SBIRS Highly Elliptical Orbit (HEO) payloads and SBIRS Geosynchronous Orbit (GEO) satellites into a comprehensive system that allowed space operators to deliver global infrared surveillance, tracking, and missile warning for theater and homeland defense. Following assumption of these responsibilities in 2004, the 460 SW continued to evolve this mission at Buckley AFB as it assumed control of the final DSP satellites in orbit and the first of the SBIRS constellation. DSP Flight 23, the last of the DSP satellites, launched in November 2007.

To operate the new HEO mission, the wing activated Detachment 1 of the 2 SWS on 1 January 2006. This detachment controlled HEO operations from the Mission Control Station-Backup at Schriever AFB, Colorado, beginning on 2 October 2007. Shortly after this, on 3 December 2007, 2 SWS Det 1 inactivated and the 11 SWS activated at Schriever to assume HEO operations. The HEO-1 payload reached operational status in November 2006, followed by HEO-2 in June 2008 and HEO-3 in May 2015. Since 28 January 2009, SBIRS GEO operations

have been executed by Det 1 of the 460th Operations Group in conjunction with the SBIRS Combined Task Force in Boulder, Colorado. The first GEO satellite launched in May 2011, followed by the second in March 2013, and these satellites achieved operational status in May and November 2013, respectively.

460th Space Wing and Buckley Air Force Base Today

As the 21st Century advances, the 460th Space Wing also continues to increase the capabilities of its space-based operations. Through 2014 and 2015, the 460 SW began implementation of Increment Two of the SBIRS program. The first step, known as Block 10, achieved operational acceptance in December 2016 and consolidated all DSP, GEO, and HEO operations at the MCS while retaining backup capabilities at Schriever AFB. Block 20 will bring the SBIRS program into final compliance with the directives established by the 1996 SBIRS Operational Requirements Document for full GEO sensor capability.

The 460 SW also continues to develop and advocate for critical base infrastructure and support needs. In 2011, the 460th Security Forces Squadron received a new military working dog facility and relocated to a brand-new headquarters in 2013. Other needs such as a new base chapel, leadership development center, and lodging have been constructed in recent years. The 460 SW demonstrated a commitment to renewable energy with the installation of a 5000-panel solar array in 2011, which provides up to 5 percent of the power used at Buckley AFB. In the future, the 460 SW intends to enhance the quality of medical care and service availability by relocating all medical facilities, including a dental clinic, onto Buckley AFB, and to provide its space operators with a new support facility for SBIRS operations to replace the original buildings constructed for DSP nearly 50 years ago. The 460 SW, its Airmen, and its mission partners remain poised to meet the challenges of national defense in the 21st Century.



Buckley Air Force Base, 2009.

Honors

Service Streamers:

World War II American Theater
Global War on Terrorism

World War II Campaign Streamers:

Rome-Arno	Normandy
Southern France	Northern France
North Apennines	Rhineland
Po Valley	Central Europe
Air Offensive, Europe	Air Combat, EAME Theater

Vietnam Campaign Streamers:

Vietnam Air	Vietnam Summer/Fall, 1969
Vietnam Air Offensive	Vietnam Winter/Spring 1970
Vietnam Air Offensive, Phase II	Sanctuary Counteroffensive
Vietnam Air Offensive, Phase III	Southwest Monsoon
Vietnam Air Offensive, Phase IV	Commando Hunt V
Vietnam Air/Ground	Commando Hunt VI
TET 69/Counteroffensive	

Distinguished Unit Citation:

Austria, 26 Jul 1944

Presidential Unit Citations:

Southeast Asia: 18 Feb 1966-30 Jun 1967
1 Sep 1967-10 Jul 1968
11 Jul 1968-31 Aug 1969
1 Feb-31 Mar 1971

Air Force Outstanding Unit Award:

1 Jul 1969-30 Jun 1970 (with Combat "V")
1 Jul 1970-30 Jun 1971 (with Combat "V")
1 Oct 1989-1 Oct 1990
1 Oct 2001-1 Oct 2002
2 Oct 2002-2 Oct 2003

Other Awards:

Republic of Vietnam Gallantry Cross with Palm: 1 Apr 1966-31 Aug 1971

Assigned Aircraft/Space Systems

460th Bombardment Group (Heavy):

B-24	1943-45
------	---------

460th Tactical Reconnaissance Wing:

EB/RB-66	1966
RC-47	1966-67
RF-101	1966-70
RB-57	1966-71
RF-4	1966-71
EC-47	1967-71

460th Tactical Reconnaissance Group:

RF-4	1989-90
------	---------

460th Space Wing:

Satellites	2004-Present
------------	--------------

Stations

460th Bombardment Group (Heavy):

Alamogordo Army Air Field, New Mexico	1 Jul 1943
Kearns Army Air Base, Utah	31 Aug 1943
Chatham Army Air Field, Georgia	29 Oct 1943
Camp Patrick Henry, Virginia (ground echelon)	4-13 Jan 1944
Spinazzolla, Italy	11 Feb 1944
Waller Field, Trinidad	15 Jun 1945
Paramirim Field, Natal, Brazil	30 Jun-26 Sep 1945

460th Tactical Reconnaissance Wing:

Tan Son Nhut Air Base, South Vietnam	18 Feb 1966-31 Aug 1971
--------------------------------------	-------------------------

460th Tactical Reconnaissance Group:

Taegu Air Base, South Korea	1 Oct 1989-1 Oct 1990
-----------------------------	-----------------------

460th Air Base Wing:

Buckley Air Force Base, Colorado	1 Oct 2001-19 Aug 2004
----------------------------------	------------------------

460th Space Wing:

Buckley Air Force Base, Colorado	19 Aug 2004-Present
----------------------------------	---------------------

Commanders

460th Bombardment Group (Heavy):

Unknown	1 Jul-11 Aug 1943
Col Robert T. Crowder	12 Aug 1943
Col Bertram C. Harrison	16 Apr 1944
Lt Col Harold T. Babb	20 Sep 1944
Col John M. Price	18 Oct 1944-unknown (at least through Apr 15)

460th Tactical Reconnaissance Wing:

Unknown	18 Feb 1966
Col Edward H. Taylor	14 Mar 1966
Col Robert G. Williams	Mar 1967
Brig Gen Robert J. Holbury	21 Dec 1967
Col Leslie J. Westbert	8 Jul 1968
Col Hal L. Fitzpatrick	28 May 1969
Col Harry M. Chapman	21 Jun 1969
Col James E. Tilton	1 May 1970
Col Dale L. Flowers	15 Apr 1971
Col Jerome F. O'Malley	1-31 Aug 1971

460th Tactical Reconnaissance Group:

Col Gene N. Patton	1 Oct 1989
Lt Col Robert S. Hillmer	13 Aug-1 Oct 1990

460th Space Wing:

Col James A. Sands	1 Oct 2001
Col Allen Kirkman, Jr.	30 Jun 2003
Col David W. Zeigler	20 Jun 2005
Col Donald W. McGee	12 Jun 2007
Col Clinton E. Crosier	19 Jun 2009
Col Daniel A. Dant	4 Jul 2011
Col Daniel D. Wright III	28 Jun 2013
Col John W. Wagner	12 Jun 2014
Col David N. Miller, Jr.	12 Aug 2016-Present

Space System Fact Sheets

DEFENSE SUPPORT PROGRAM



Mission: The Defense Support Program (DSP) satellites provide early warning for Intercontinental Ballistic Missile (ICBM) and tactical launches. This once classified satellite, now known as DSP, was first launched in 1970 and became the first of many to be launched over the next 37 years. DSP satellites use infrared sensors to detect heat from missile and booster plumes against the Earth's background in support of the missile early warning and missile defense mission areas.

Description: The legacy DSP constellation is operated from the Space Based Infrared System (SBIRS) Mission Control Station (MCS) at Buckley Air Force Base, CO. DSP is managed by the Remote Sensing Systems Directorate (RS) at the US Air Force Space and Missile Systems Center. Contractors for the DSP satellite were TRW (now Northrop Grumman Aerospace Systems) for the spacecraft and Aerojet (now Northrop Grumman Electronic Systems) for the infrared sensor.

DSP grew out of the successful 1960s space-based infrared Missile Defense Alarm System known as MIDAS. The first successful launch of MIDAS was 24 May 1960. Between 1960 and 1966, 12 MIDAS launches deployed four different types of increasingly sophisticated sensors, leading the way to the development, launch, and use of DSP.

On 6 November 1970, the U.S. Air Force launched the first DSP satellite on a Titan IIIC rocket from Launch Complex 40 at Cape Canaveral Air Force Station, Fla. DSP had a history of launching atop Titan III and IV family of launch vehicles (to include the Titan addition of the Solid Rocket Motor Upgrade) with two exceptions. DSP-16 was launched aboard NASA's Space Shuttle Atlantis in November 1991. The most recent launch, DSP-23, was carried into geosynchronous orbit by United Launch Alliance's Delta IV Heavy launch vehicle in November 2007, the first operational launch for that launch vehicle.

Since the early 1970s, DSP has been the backbone of the ballistic missile early warning system of the United States. The primary mission was to provide early warning to command authorities of intercontinental ballistic missile (ICBM) launches from anywhere in the world that could impact North America. As the program evolved, the mission was expanded to also provide early warning for shorter-range theater ballistic missile launches to support theater commanders in relevant areas around the world. Initially, DSP ground stations were distributed all over the globe, with each station receiving data from the satellites in their field of view. The SBIRS MCS achieved Initial Operational Capability (IOC) in December 2001, which consolidated ground operations of all DSP satellites in a single location. Since the 2001 IOC, an evolution of the MCS is ongoing to seamlessly add SBIRS space elements after they launch. The DSP mission also includes providing detection of nuclear detonations high above the earth via a secondary sensor. DSP data is transmitted to the MCS where the data is processed and messages are released in near real-time onto appropriate communication networks for each of these missions. In addition, data processing has also been developed and implemented at the MCS ground site to extract special events, which are also sent out as messages to commanders.

In recent years, scientists have developed methods to use DSP's infrared sensor as part of an early warning system for natural disasters like volcanic eruptions and forest fires. In addition, researchers at The Aerospace Corporation have used DSP data to develop portions of a hazard support system that will aid public safety in the future.

System Features: In response to the evolving threats, DSP has undergone five major upgrades that allowed it to provide more accurate and reliable data to the warfighter. For example, the addition of a medium wavelength infrared capability has provided enhanced missile warning mission utility. This upgrade marked the first space sensor application of mercury cadmium telluride infrared sensors, the material of choice for today's infrared sensors. All of the DSP satellites were spinning satellites with the infrared sensor at the front end of the spacecraft. The DSP satellites orbit the earth approximately 22,000 miles over the equator. The current DSP spacecraft is more survivable than its predecessors, accommodates 6,000 detectors, uses approximately 1,275 watts of power, with an on-orbit weight of approximately 5,200 pounds at the beginning of life, including fuel.

- Block 1: Phase I, 1970-1973, 4 satellites
- Block 2: Phase II, 1975-1977, 3 satellites
- Block 3: Multi-Orbit Satellite Performance Improvement Modification (MOS/PIM), 1979-1984, 4 satellites
- Block 4: Phase II Upgrade, 1984-1987, 2 satellites
- Block 5: DSP-1, 1989 - 2007, 10 satellites launched

- First launch on 6 November 1970
- Final launch on 10 November 2007

(Copied from the US Air Force Fact Sheet, dated April 2015)

Space System Fact Sheets

SPACE-BASED INFRARED SYSTEMS



SBIRS GEO Satellite



SBIRS HEO Payload. Photo by Lockheed Martin.

Mission: The SBIRS program is the follow-on capability to the highly successful Defense Support Program (DSP). The SBIRS program was designed to provide a seamless operational transition from DSP to the Nation's next-generation Overhead Persistent Infrared sensors to meet jointly defined requirements of the defense and intelligence communities in support of the missile early warning, missile defense, battlespace awareness, and technical intelligence mission areas.

Description: The SBIRS architecture includes a resilient mix of satellites in geosynchronous earth orbit (GEO), payloads in highly elliptical orbit (HEO), as well as ground-based hardware and software. The integrated system supports multiple missions simultaneously, while providing robust performance with global, persistent coverage. Air Force Space Command's 460th Operations Group is responsible for conducting HEO, GEO, and DSP operations at all fixed ground sites while the Air National Guard Unit, 233d Space Group, operates the Mobile Ground System (MGS) to provide survivable and enduring mission support for the DSP constellation. The SBIRS program is managed by the Remote Sensing Systems Directorate (RS) at the US Air Force Space and Missile Systems Center. Lockheed Martin (LM) Space Systems Company is the prime contractor responsible for program management, systems engineering, and spacecraft development, while LM Information Systems and Global Solutions is the ground systems developer. Northrop Grumman Electronic Systems is the payload subcontractor for the infrared sensors.

Two HEO sensors and two GEO satellites are certified for mission operations. The first and second GEO satellites were launched on United Launch Alliance's (ULA) Atlas V rocket from Space Launch Complex (SLC) 41 at Cape Canaveral Air Force Station. With updates to the Increment 1 ground system (declared operational with the DSP satellite system in December 2001), the SBIRS Mission Control Station (MCS) is United States Strategic Command's focal point for Overhead Persistent Infrared (OPIR) operations, consisting of the constellation of GEO satellites, HEO sensors, and the legacy DSP satellites. Increment 2, the next major SBIRS ground update, was divided into two software releases; Block 10.3 and Block 20. Block 10.3 is on track for transitioning to operations in mid-2016, replacing all the Increment 1 software and improving infrared event detection. The SBIRS Survivable/Endurable Evolution (S2E2) program will replace the aging MGS, initially designed for support of DSP operations in the 1960s.

System Features: The SBIRS sensors are designed to provide greater flexibility and sensitivity than the DSP infrared sensor and detect short-wave and mid-wave infrared signals, allowing SBIRS to perform a broader set of missions. These enhanced capabilities result in improved prediction accuracy for global strategic and tactical warfighters. The on-going evolution of the ground system has also resulted in improved mission processing software, resulting in increased event message accuracy, and reduced manpower for support and operations of the DSP and SBIRS portfolio.

The GEO spacecraft bus consists of a militarized, radiation-hardened version of the Lockheed Martin A2100 spacecraft, providing power, attitude control, command and control, and a communications subsystem with five separate mission data downlinks to meet mission requirements, including system survivability and durability requirements. The GEO infrared payload consists of two sensors; a scanner and a step-starrer. The scanning sensor continuously scans the earth to provide 24/7 global strategic missile warning capability. Data from the scanner also contributes to theater and intelligence missions. The step-staring sensor, with its highly-agile and highly-accurate pointing and control system, provides coverage for theater missions and intelligence areas of interest with its fast revisit rates and high sensitivity. The HEO sensor is a scanning sensor, with sensor pointing performed by slewing the full telescope on a gimbal. Both the GEO and HEO infrared sensors gather raw, unprocessed data that are down-linked to the ground for mission processing. The GEO sensors perform on-board signal processing and transmit detected events to the ground, in addition to the unprocessed raw data.

The first and second HEO payloads were announced on-orbit (with mission performance surpassing specifications) by the Air Force in November 2006 and June 2008, respectively. The first and second GEO satellites were launched on 7 May 2011 and 19 March 2013 respectively.

- Dimensions

--HEO sensor: approximately 7 ft x 4 ft x 3 ft

--GEO satellite: approximately 49 ft x 22 ft x 20 ft with all appendages deployed on-orbit

- Weight (all weights approximate)
 - HEO sensor: 536 lbs
 - GEO satellite: on-orbit, 5603 lbs, including a 1,100 lbs two-sensor payload and 430 lbs of fuel
- GEO power source: 2 deployable, sun-tracking solar arrays

(Copied from the US Air Force Fact Sheet, dated August 2015)

Bibliography

Army Air Forces Technical Training Command. *Buckley Field, Denver, Colorado*, 1943.

Bohnstedt, Duane L. and Betty J. *460th Bomb Group History*, 1996.

Colorado Air National Guard. *Colorado Pride: A Commemorative History of the Colorado Air National Guard, 1923-1988*, 1989.

Mehls, Stephen F., Carol J. Drake and James E. Fell, Jr. *Aurora: Gateway to the Rockies*, 1985.

Michel, Thomas John. *Buckley Air Force Base: Boom Base in Boom Town Aurora*, 2006.

Richelson, Jeffrey T. *America's Space Sentinels: The History of the DSP and SBIRS Satellite Systems*, 2012.

Periodic Histories of Buckley Field, 1942-1946; Naval Air Station-Denver, 1947-1952; 460th Tactical Reconnaissance Wing, 1966-71; 460th Air Base Wing, 2001-2003; and 460th Space Wing, 2004-2016

*Mr. Christopher J. McCune
History Office
460th Space Wing
Buckley Air Force Base
Colorado
720-847-5539*

Current as of January 2016