2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the United States Air Force's (Air Force) proposal to expand and enhance the Powder River airspace to become the Powder River Training Complex (PRTC). Establishing the PRTC would address the training deficiencies and limitations described in Chapter 1.0. Section 2.1 provides a background for the proposed Powder River airspace action. This background explains the existing Powder River airspace and the B-1 and B-52 training requirements. Section 2.2 describes the training requirements and limitations and constraints of current training opportunities. Section 2.3 defines the process used to identify reasonable alternatives which meet the purpose and need presented in Chapter 1.0. Section 2.4 presents an overview of the proposed action including elements common to all action alternatives. Sections 2.5 through 2.7 describe three action alternatives, Alternative A, Alternative B, and Alternative C, which differ materially from each other. The Air Force's Proposed Action is Alternative A. Section 2.8 presents the No-Action Alternative that reflects no changes to the existing Powder River airspace.

2.1 Background for the Proposed Action

2.1.1 Bases

Ellsworth Air Force Base (AFB) covers approximately 5,400 acres of rolling plains about 12 miles east of Rapid City, South Dakota (SD). What is now Ellsworth AFB was established as an Army Air Corps Base in 1942 and served as a training base for various bomber and fighter aircraft during World War II. Since its transfer to the Air Force in 1947, Ellsworth AFB has been the home of the 28th Bomb Wing (28 BW) and a succession of bomber aircraft including B-29s, B-52s, and the current complement of B-1s.

Ellsworth AFB's 28 BW supports 24 primary mission aircraft inventory B-1s divided into two squadrons of 12 aircraft each. B-1s from Ellsworth AFB have been deployed and remain heavily involved in combat missions, especially in Afghanistan. Multiple new missions have evolved during these deployments, particularly Close Air Support and Time-Sensitive Targeting.

Minot AFB covers approximately 5,000 acres of land in the north central part of North Dakota (ND), and is located 13 miles north of the city of Minot. Minot AFB was activated in 1957 in response to the Cold War need for northern tier defenses. Starting as an Air Defense Command Base with F-106 interceptor aircraft and tankers, Minot AFB quickly evolved into a home for B-52s by the early 1960s. About that same time, Minot AFB became the base for the 455th Strategic Missile Wing operating arrays of Minuteman Intercontinental Ballistic Missiles. Conversion of the F-106s to F-15s occurred in the mid-1980s. After the F-15 fighter squadron was deactivated in 1988, Minot AFB focused on supporting B-52s and Minuteman Missiles. Currently, Minot AFB supports the 5 BW with two squadrons of B-52 bombers.

Section 2.3 describes the alternative selection process. The results of applying the selection criteria demonstrate the Powder River airspace and the surrounding area represents the only location with existing airspace that meets the purpose and need from Chapter 1. Table 2-7 summarizes the application of these selection criteria to locations in Section 2.3.2 and includes the alternatives considered but not carried forward from Section 2.3.3 below. As noted in Section 2.2.2, the existing Powder River airspace can support only one formation of aircraft (two B-1 aircraft with new technologies) at any given time. The proposed PRTC would provide up to four appropriately-sized airspace blocks that could support four formations of training aircraft. PRTC would provide airspace of sufficient size and volume, to enable use by bombers, maximize training time, have Large Force Exercise (LFE) capability, reduce the potential for conflict with civil aviation, and include steps to limit safety and

environmental conflicts. The proposed PRTC, with management and mitigations, would meet the selection criteria identified.

2.1.2 Airspace

The existing Powder River airspace consists of two Military Operations Areas (MOAs), four Air Traffic Control Assigned Airspace (ATCAA) units, the Belle Fourche Electronic Scoring Site (ESS), and associated electronic threat emitter and simulated target locations. Figure 2-1 presents the existing Powder River airspace, including associated MOAs and ATCAAs. The Crossbow ATCAA is identified on this figure and in this Environmental Impact Statement (EIS) as training airspace used in conjunction with the Powder River MOAs and ATCAAs. In accordance with a 10 December 2006 Letter of Agreement between Denver, Salt Lake City, and Ellsworth, the Crossbow ATCAA is not part of the Powder River airspace. The Crossbow ATCAA is not usable at and above Flight Level (FL) 270 daily between 8:00 am-11:00 am local and between 2:30 pm-4:30 pm local. The Crossbow ATCAA is given in block altitudes of 1,000 feet per aircraft. In addition, three Military Training Routes (MTRs) are in the vicinity and aerial refueling typically occurs within the ATCAAs. Figure 2-2 describes the types of training airspace and the way they interact.

Aviation and Airspace Use Terminology

Above Ground Level (AGL): *Altitude expressed in feet measured above the ground surface.*

Mean Sea Level (MSL): *Altitude expressed in feet measured above average (mean) sea level.*

Flight Level (FL): *Manner in which altitudes at 18,000 feet MSL and above are expressed, as measured by a standard altimeter setting of 29.92.*

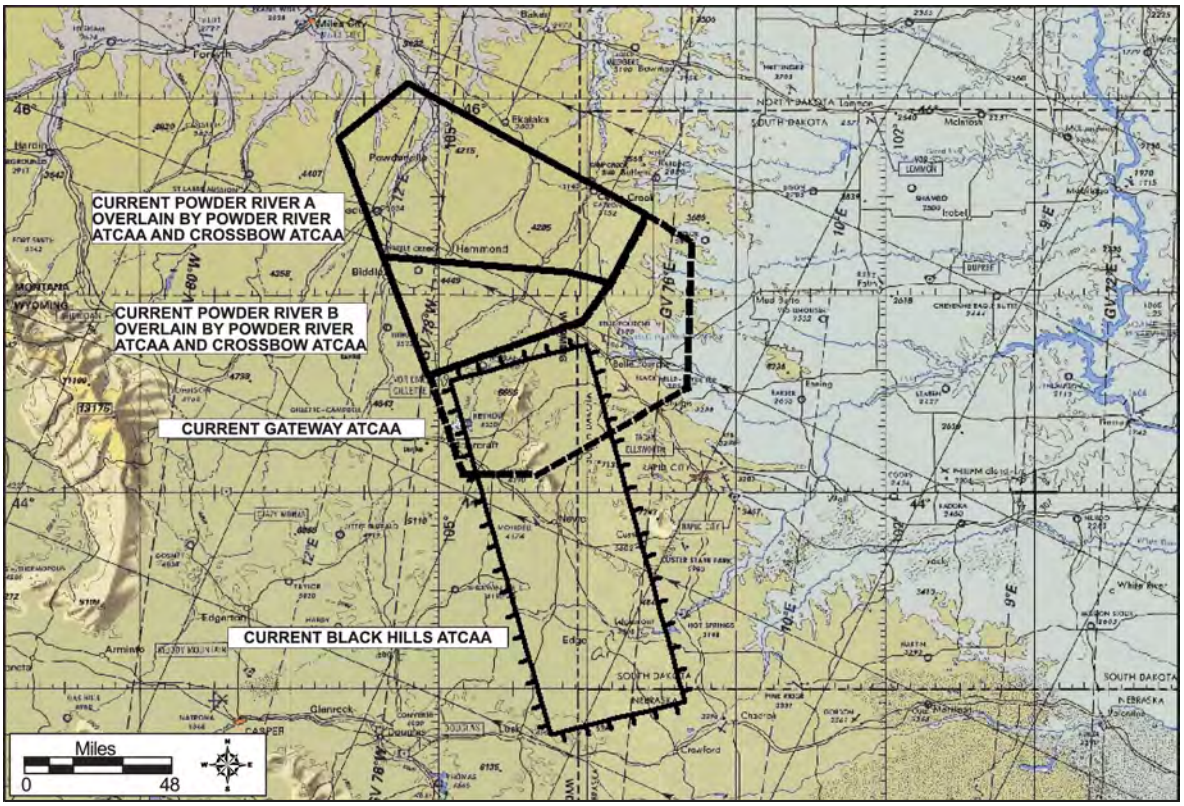
Visual Flight Rules (VFR): *A standard set of rules that all pilots, both civilian and military, must follow when not operating under instrument flight rules and in visual meteorological conditions (conditions with sufficient conditions to maintain visual separation from terrain and aircraft). These rules require that pilots remain clear of clouds and avoid other aircraft.*

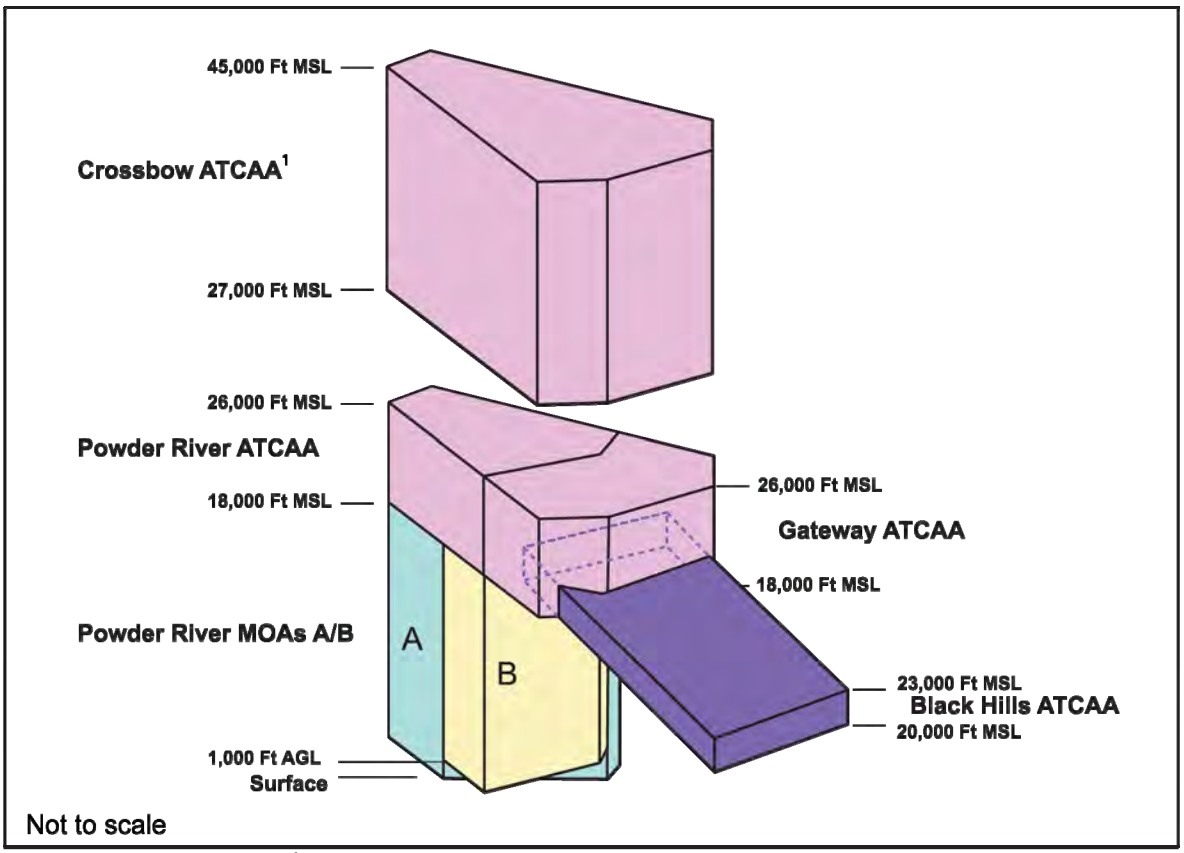
Instrument Flight Rules (IFR): *A standard set of rules that all pilots, civilian and military, must follow when operating under flight conditions that are more stringent than visual flight rules. These conditions include operating an aircraft in clouds, operating above certain altitudes prescribed by Federal Aviation Administration (FAA) regulations, and operating in some locations such as major civilian airports. Air Traffic Control (ATC) agencies ensure separation of all aircraft operating under IFR.*

Source: FAA Pilot/Controller Glossary 2010

The Powder River airspace lies about 70 nautical miles (NM) northwest of Ellsworth AFB and about 200 NM southwest of Minot AFB and serves as the primary training airspace for the B-1s from Ellsworth AFB and the preferred training airspace for B-52s from Minot AFB. The existing Powder River airspace, including associated MOAs and ATCAAs (Figure 2-1), overlies an area of 10,235 square NM in portions of SD, Wyoming (WY), and Montana (MT). Linked to the Belle Fourche ESS, the Powder River airspace has provided simulated electronic combat and simulated weapons release since the mid-1980s. The Belle Fourche current electronic threats and associated sites are presented in Figure 2-3. The Air Force created the Powder River MOAs in 1987 to permit dissimilar training with fighter intercepts of bombers training for Cold War era low-level penetration missions. Portions of the training airspace which now constitute the Powder River airspace have been used for military aircraft training since World War II.

Primary current users of the Powder River airspace consist of B-1s from the 28 BW, Ellsworth AFB, and B-52s from the 5th Bomb Wing (5 BW), Minot AFB. Transient (occasional) users of the training areas include: B-1s and B-52s from other bases; B-2s from the 509th Bomb Wing, Whiteman AFB, Missouri; RC-135s from the 55th Wing, Offutt AFB, Nebraska; F-15s, F-16s, and other fighters, tankers, and other aircraft from various bases typically from the surrounding area.





Note: 1. Per LOA, not part of Powder River Airspace.

Figure 2-1. Existing Powder River Airspace

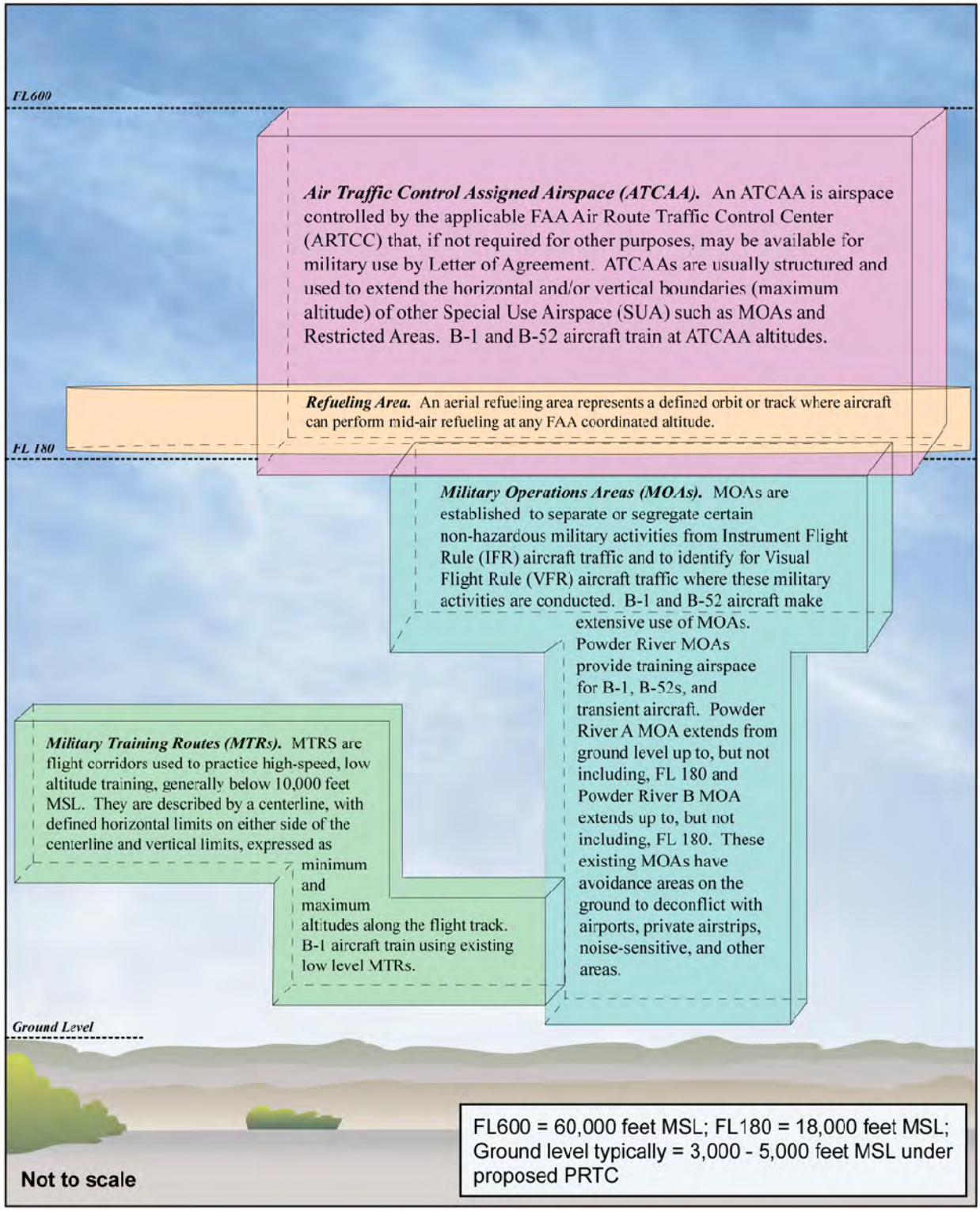


Figure 2-2. Explanation of Types of Training Airspace

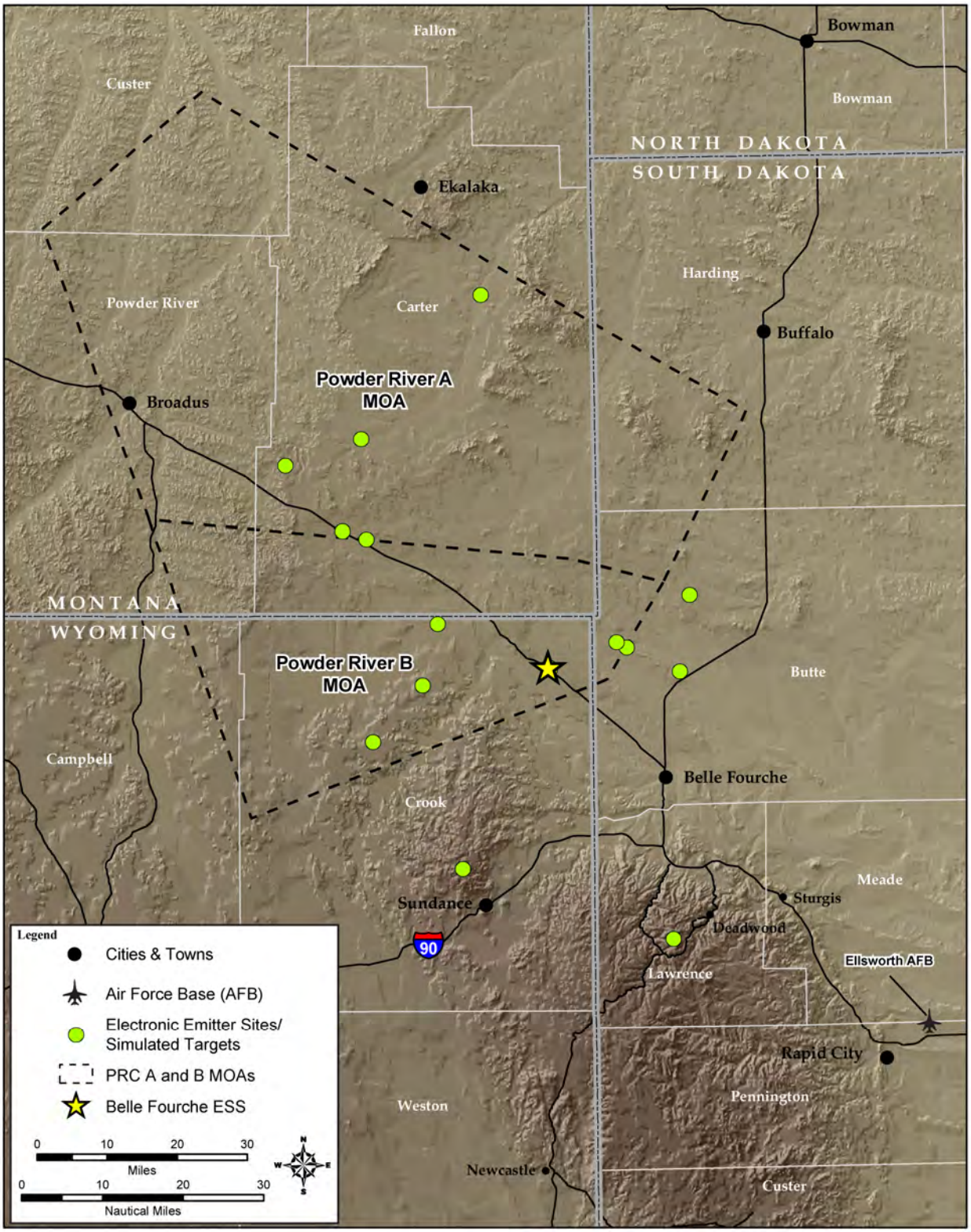


Figure 2-3. Powder River MOAs, Belle Fourche Electronic Threats, and Associated Sites

2.1.3 Electronic Scoring Site and Ground-Based Assets

Aircrews need to train to avoid and, frequently, to suppress ground-based threats. The Belle Fourche ESS provides electronic training with a series of ground-based electronic threat assets, many of them located on former Minuteman Missile sites in SD, MT, and WY. These threat asset locations are depicted in Figure 2-3. The main ESS is located on Highway 212 in WY, 24 miles northwest of Belle Fourche, SD.

The Belle Fourche ESS, as seen from Highway 212, provides high fidelity surface-to-air threat signals as well as a variety of no-drop targets for aircrews training within the Powder River airspace.

The ESS sites typically consist of a threat emitter which can simulate enemy radar and a visual target such as a mock-up of surface-to-air missiles or a mobile rocket launcher. Section 2.2.1 describes the interaction of these threat emitters and targets with bomber training missions.

These ground-based assets under the airspace provide invaluable training to aircrews as they experience combat conditions. The Belle Fourche ESS provides high fidelity threat signals to aircrews and maintains the flexibility to meet individual crew training requirements. The ESS threats cannot be met with a realistic immediate response to deploy defensive chaff and flares and rapidly maneuver at supersonic speeds to avoid the threat because chaff and flares and supersonic flight cannot now be conducted in the Powder River airspace.

During the Cold War era, the primary combat mission of B-1, B-52, and now retired FB-111 bombers, was long-range, nuclear attack by penetrating deep into enemy territory at low-altitudes below radars. As enemy defensive and offensive capabilities improved, bomber training was made more realistic to keep up with threats. Threat emitters to simulate enemy surface-to-air threats were added at retired Minuteman sites, and the Powder River MOAs were added for fighter interceptors to attack the bombers and to create realistic maneuvering airspace for the bombers.

This training with dissimilar aircraft and tactics enabled aircrews to train as they would fight Cold War era missions. Ellsworth AFB and associated training airspace provided an array of low-altitude MTRs that merged over ground-based threat simulators and into the Powder River MOA. Ground and air defenses, including fighter aircraft, defended simulated target areas against the bombers on their final bomb runs.

The roles of aircraft in combat have changed and their missions have changed. Changes in missions, shifts in force structure, and new long-range sensor and targeting technologies have affected the use of the Powder River airspace. Deployments, training needs, maintenance capabilities, and aircraft inventory affect sortie-operations in the Powder River airspace.

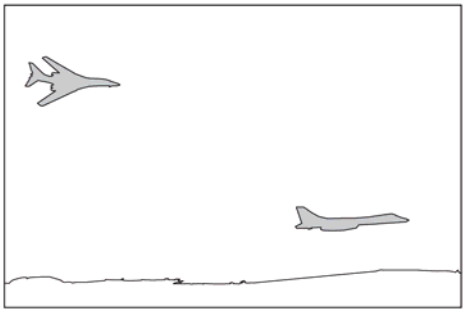
A sortie-operation is the use of one training airspace by one aircraft. This means that two B-1s flying in both Powder River A and B MOAs would generate 2 aircraft x 2 airspaces = 4 sortie operations. Annual sortie-operations in the Powder River MOAs for the period between Fiscal Years (FY) 1995 and 2004 varied between 675 and 1,888 for Powder River A MOA, and 659 and 2,020 for Powder River B MOA. On average, training aircraft conduct slightly more than 2,500 annual sortie-operations in the Powder River airspace.

Near continuous deployment of one-half of the B-1 aircraft from Ellsworth AFB to fight the Overseas Contingency Operation in Iraq and Afghanistan has reduced training activity by approximately one-third during the war. Bombers traditionally dominated training flights in the Powder River airspace and accounted for approximately 95 percent of the annual baseline sortie-operations. Transient fighter

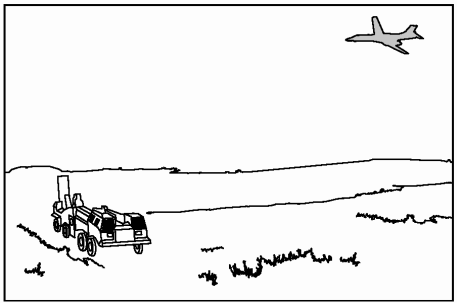
aircraft have accounted for approximately 5 percent of baseline activity. The B-1 is a large aircraft with fighter-like performance. Two B-1 training aircraft typically schedule both Powder River MOAs and "use up" all the MOA airspace in training maneuvers. Use of overlying and associated ATCAAs tended to mirror operations in the MOAs. B-52s conduct most of their current training in ATCAAs above the MOAs.

2.1.4 B-1 and B-52 Missions

During the Cold War era, the primary combat mission of the B-52 and B-1 bombers was long-range, nuclear attack using low-level penetration tactics. Their secondary mission was an array of conventional operations that included bombing enemy transportation systems, troop concentrations, airfields, air defense facilities, and other similar large defined targets. Today, the bombers' primary role has changed. The B-1 and B-52 primary mission is worldwide, rapid-response and sustained operations with a variety of new sensors and diverse munitions. The training requirements to ensure bomber aircrew readiness have multiplied. Now aircrews must train to be proficient in a vast and growing array of combat missions that employ a diverse array of weapon systems, and face increasingly sophisticated threats.



A typical training mission in the Powder River airspace consists of two B-1 aircraft. The ESS threat capabilities, B-1 speeds, and target identification capabilities of the B-1 results in two training aircraft requiring all the current Powder River airspace for a realistic training mission.



Close Air Support is a new B-1 mission which requires identification of targets and close coordination with ground forces. Time- Sensitive Targeting is another new mission which requires the B-1 to find, fix, track, identify, and destroy a target.

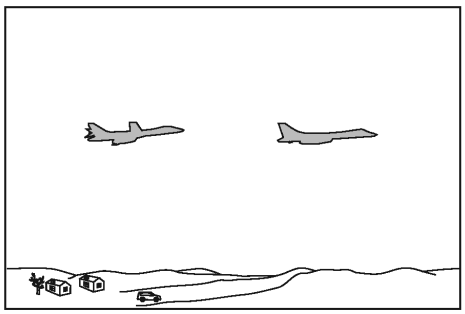
Bombers now have a wide range of responsibilities, and any mission could involve different targets, weapons, defense situations, altitudes, and flight profiles. These missions range from interdiction to Close Air Support to Show of Force. Table 2-1 describes today's missions and associated tactics. Tomorrow's missions will involve more sensors and accurate munitions against substantially improved defensive systems.

One example of a new mission which requires both independent aircrew training and training with other aircraft is Non-Traditional Intelligence, Surveillance, and Reconnaissance. Non-Traditional Intelligence, Surveillance, and Reconnaissance requires integrated capabilities to collect, possess, exploit, and disseminate accurate and timely information. This information provides the battlespace awareness necessary to plan and conduct operations. Non-Traditional Intelligence, Surveillance, and Reconnaissance is performed by bombers and other aircraft which have new sensor equipment to accomplish this role. This role can be conducted by bombers orbiting a battlefield area. The processed sensor information expands the battlespace information traditionally collected by satellites and/or RC-135 information and communications aircraft. In actual combat and in realistic training, a B-1 Non-Traditional Intelligence, Surveillance, and Reconnaissance mission could quickly become a B-1 Time-Sensitive Targeting mission.

Table 2-1. Combat Missions for B-1 and B-52 Aircrews

Mission	*Definition*
Interdiction and Airborne Alert Interdiction	Interdiction missions involve air-to-ground ordnance delivery against strategic or tactical targets away from the battlefield. In a traditional interdiction mission, a force package of multiple aircraft proceeds to the target area and each performs a different role (e.g., attack/bombing, anti-missile, air-to-air). Target defenses can be anti-aircraft surface-to-air and/or defending fighter aircraft. Bombers on airborne alert can be directed to a primary target to deploy a variety of weapons.
Close Air Support and On-call Close Air Support	Close Air Support represents a new primary bomber mission where aircraft provide coverage of a predefined areas (or target box) in which allied and enemy ground forces are operating. Through close coordination with ground troops, aircraft strike the opposing forces with air-to-ground ordnance.
Show of Force	For the bombers, a Show of Force mission functions like a Close Air Support operation without employing weapons. By flying a low- or medium-altitude pass over the enemy on the ground, the size of the bomber aircraft, the sound it generates, and the speed of the attack combine to demoralize and disperse the enemy.
Time-Sensitive Targeting	Although similar to Close Air Support, this mission involves no coordination with a ground controller. Rather, bombers fly predetermined orbits for 2 to 4 hours awaiting target information and attack authorization. Target information may come from ground, air, or command level sources. When authorized, the bombers deliver ordnance on the target coordinates.
Counter Sea	Both B-1s and B-52s employ mines on land and sea. Performed from a range of altitudes, this mission resembles interdiction.
Non-Traditional Intelligence, Surveillance, and Reconnaissance	The B-1 and B-52 bombers above a combat or non-combat area can employ new on-board or pod-based sensors to collect critically important intelligence information and communicate that information through an interface with coalition assets. Performed from a range of altitudes, the mission can become Time-Sensitive Targeting to implement ordnance employment or other decisions.

Primary missions for the B-1s and the B-52s have a few differences. The B-1s conduct conventional (non-nuclear) attacks only, whereas the B-52s have responsibility to train for a nuclear attack, conventional strategic attack, and counter air/land. B-1s are the only bomber in the United States (U.S.) inventory with low-level terrain following and terrain avoidance capability optimized for 2,000 feet above ground level (AGL) or below. B-52s no longer perform low-altitude attack missions, but still must fly at low altitude (1,000 feet AGL) for proficiency training. B-1s can achieve supersonic speeds, and B-52s are subsonic aircraft.



Show of Force constitutes a B-1 flying over an enemy position at high speed to let them know "we are watching." This disorients the enemy and has successfully suppressed enemy fire in areas where both combatants and non-combatants are intermingled.

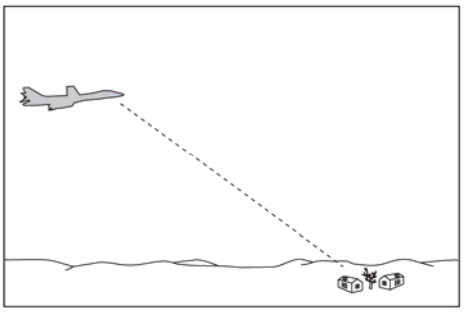
Bomber aircrews must perform all their missions using teamwork to penetrate air defense systems, fly the aircraft into the proper position for sensor or ordnance employment, interface with coalition assets, and maintain the aircraft's geographic position and timing to stay in formation with other aircraft. Table 2-2 lists the responsibilities of B-1 and B-52 aircrew and reflects the complexity of interactions among the crew. Difficult decisions must be made in split seconds to determine if a maneuver will move the bomber out of position to accomplish its mission or put the aircraft within range of enemy missiles or guns. Training is essential for these decisions. Combat, such as is now being waged in Afghanistan, produces an array of threats which often come from unexpected locations. Added challenges include complicated missions occurring at night, under bad weather conditions, in mountainous terrain, or involving complex sensor or data link challenges. To survive combat, aircrews must train as they will fight and simulate these situations to the greatest degree possible. Not only must aircrews within individual aircraft train to work together in a closely coordinated manner, they must also train as part of

an LFE typically composed of approximately 20 aircraft of various types, each with a specific mission component and each with a separate chain of command. All of this requires time and access to realistic training airspace assets for quality aircrew training.

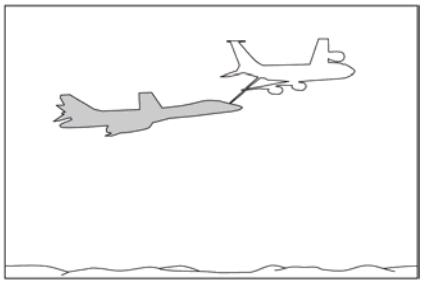
Table 2-2. Bomber Aircrew Duties

Position	*Duties*
B-1 CREW	
Aircraft Commander	Mission commander: command, control, and crew coordination
Pilot	Assists Aircraft Commander: communications and aircraft control
Weapons System Officer/Offensive	Manages sensors, navigation, and systems
Weapons System Officer/Defensive	Primary for electronic warfare and threat avoidance
B-52 CREW	
Aircraft Commander	Mission commander: command, control, and crew coordination
Pilot	Assists Aircraft Commander: communications and aircraft control
Radar Navigator	Primary for munitions launches, target timing
Navigator	Navigates high level, assists Radar Navigator
Electronic Warfare Officer	Primary for electronic warfare and threat avoidance

When aircrews fly combat missions, they risk their lives. To reduce that risk and increase the chance for a successful mission, bomber aircrews need the most realistic training possible. Recent situations in Iraq and, especially, Afghanistan further expanded the role and expectations for bomber aircraft, especially B-1s and B-52s. Targets in these combat zones can occur anywhere and rarely consist of traditional defenses, industrial sites, or massed enemy troops. Rather, the targets comprise a single structure shielded by dwellings of non-combatants, a single vehicle or small group of vehicles, or a band of insurgents attacking a patrol of allied soldiers. Effective neutralization of such targets requires that the bombers respond immediately to locate, identify, and destroy the target while avoiding damage to friendly forces, civilians, and infrastructure. During the combat mission, precise timing must be coordinated with other aircraft, ground troops, or remotely piloted aircraft systems to provide real-time targeting data, rapid response, and pinpoint accuracy.



New B-1 capabilities include the optical ability to visually track, identify, and then engage small targets.



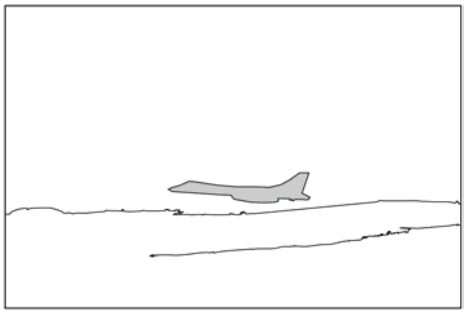
Training includes air-to-air refueling which is currently performed on air refueling routes around the Powder River airspace and in ATCAAs.

B-1 and B-52 combat missions involve a range of additional activities, including aerial refueling, high-altitude flight to the combat theater, the full breadth of command, communication, and control, entry into enemy territory, avoidance of enemy threats, employing sensors, delivering ordnance, and returning safely to base. These activities require a variety of altitudes, depending upon the mission. Aircrews must be trained to accomplish the mission with degraded or partial system functionality.

In its simplest terms, combat is about defeating the enemy and preventing harm to U.S. and allied forces. Bombers have deployed to fly combat missions for Operation Southern Watch, Operation Allied

Force, Operation Iraqi Freedom, and Operation Enduring Freedom. Bombers are repeatedly in hostile airspace as the aircraft of choice to support allied operations.

While bomber aircrews must emphasize missions driven by current conflicts and threats, they also must remain prepared to effectively execute all the missions identified by the President and Secretary of Defense for that type of aircraft. Because conflicts with insurgent forces now dominate current tactics, aircrews cannot ignore the need to be ready for deep interdiction attacks or other formerly traditional combat missions. This requirement means that, at any time, aircrews could be tasked to perform any tactics or maneuvers within the possible breadth of combat missions. Figure 2-4 describes one training example for a representative Time-Sensitive Targeting combat mission within the Powder River airspace. New aircraft capabilities, the airspace size, and lack of available ESS facilities in eastern airspaces on Figure 1-1 limit the amount of local quality training available to Ellsworth and Minot AFBs based aircraft.



The B-1 low-altitude penetration capability is optimized for 2,000 feet AGL and below and needs topographic relief for realistic training.

Site MM-9 is typical of the ground targets under the existing Powder River airspace. There is an outer barbed-wire fence and an inner chain link fence which formerly enclosed an Intercontinental Ballistic Missile silo. The visual target is located to the left of the chain link fence.

The visual target at MM-9 is a simulated SCUD highly mobile transporter-erector launcher. "SCUD" applies to any of a series of mobile ballistic missiles originally of Soviet design. During training, a B-1 aircrew would spot the SCUD, maneuver to attack it, and deploy simulated weapons to destroy the SCUD launcher. In actual combat, they would seek to attack before the SCUD could launch.

Meanwhile, a few air miles away, the B-1 attacking the SCUD could be threatened itself by the simulated surface-to-air missile launches at Site MM-8. In combat, the aircrew would be required to take evasive actions, deploy countermeasures such as chaff and flares, and/or use weapons to suppress the surface-to-air missile site. Most of these critical defensive reactions have to be simulated in the Powder River airspace.

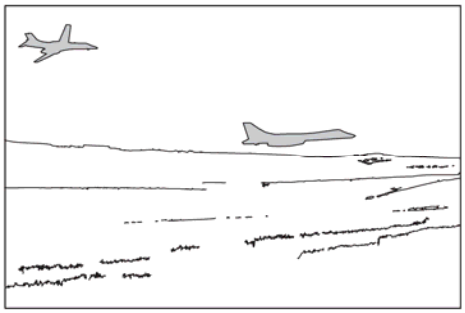
Figure 2-4. Representative Targets Relating to Mission Combat Training in the Powder River Airspace

The types of bomber missions and tactics vary with changes in world situations, increases in enemy capabilities, and advances in Air Force aircraft and weapons. Air Force personnel must consistently adapt and train to meet the challenge of these changes. Such changes can influence the altitude at which aircraft fly, the types of ordnance used, the tactics used in attacking targets and avoiding threats, and other aspects of combat missions. Aspects of aircrew training can vary with time or deployment cycles as the Air Force responds to such changes. Preparing for these varied missions means that aircrews must have flexibility in training to respond to evolving global situations.

2.2 Training Requirements and Limitations

2.2.1 Bomber Combat Roles Define Training Requirements

Bomber combat missions vary day-to-day as enemy locations, targets, air defenses, and objectives change. For one mission, a bomber aircrew could be tasked to perform high-altitude bombing of an enemy's fuel depot; the next mission could involve a low-altitude Close Air Support attack on enemy troop concentrations combined with a Time-Sensitive Targeting mission. Every interdiction combat mission involves a number of different aircraft performing a precisely timed and planned sequence of events. Failure by a single aircraft to achieve the necessary timing, coordination, and positioning could jeopardize an entire mission. Each combat mission involves a variety of actions, so aircrews must be fully trained to accomplish a wide variety of tasks. Table 2-3 correlates a combat mission to training requirements demonstrating an example of the substantial number of activities that must be mastered for just one type of mission. By adding in the need for each of the B-1 four, or B-52 five, crew members to be skilled in executing their part in every event, and by multiplying this requirement by the array of missions assigned to the B-1s and B-52s, the demands placed on obtaining sufficient training become enormous.



High- and low-altitude training and training for coordinated attacks by multiple aircraft are typically performed during each training mission.

2.2.1.1 Aircrew Training Requirements

Section 2.1.4 describes the complex missions of the B-1 or B-52 bomber. The aircraft and weapons systems require coordination among multiple crew members and can only successfully accomplish a mission when all members of the crew are working together. Extensive integrated aircrew training requires the team to perform the events and activities in sequence and with the speed and pace of combat. Technologically advanced flight simulators are used to train crews to work together and to cope with various flight assignments and challenges. These flight simulators are applied to the extent possible to support actual flight training. Simulators help with training, but they cannot reproduce all the experiences of actual in-flight training. Integrated, realistic training requires a combination of airspace and ground-based assets that are linked and arranged to provide a sequence of events which replicate combat. The Air Force training structure is a multi-level process to achieve combat readiness. Training addresses each aircrew's roles and actions for every aspect of every mission described in Section 2.1.1. Training demands correct reactions and team interactions in split-seconds, particularly when aircrews have limited response time to address targets. Aircrews must train to a "zero fault" standard to avoid endangering neutral or friendly elements and to protect their aircraft and themselves.

Realistic, integrated team training ensures that bomber aircrews possess the skills and readiness for combat. This training 1) mirrors combat events, 2) links a realistic sequence of training activities into a

cohesive mission, and 3) hones aircrew teamwork. Each training sortie (whether an individual aircraft, two aircraft, or part of a larger exercise) requires realistic, linked, and sequenced activities that equate to combat events.

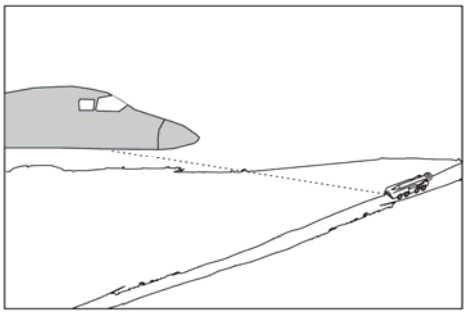
Table 2-3. Correlation of Combat Events and Training Requirements for a Typical Airborne Alert Interdiction Mission

Event Sequence	*Combat Event Descriptions*[1]	*Training Requirements*
Event No. 1	Fly high altitude to combat airspace or to a refueling rendezvous; locate and join tanker aircraft; refuel and fly to airborne alert location	Navigation and communication In-flight rendezvous with tanker aircraft Aerial refueling along established track Flight management and formation flying
Event No. 2	Enter combat airspace; coordinate with command and control (e.g., Airborne Warning and Control Systems); receive direction; join other aircraft in strike package conducting mission	High- and/or low-altitude navigation Defensive tactics against airborne and ground threats -Aircraft maneuvering -Terrain following/terrain avoidance -Navigate and downlink systems management -Electronic countermeasures employment -Defensive countermeasures employment -Course deviations (lateral and vertical) -Airspeed changes -Communication Flight management and formation flying
Event No. 3	Fly to initial point of attack; avoid ground-based threats; attack target and deliver ordnance (i.e., bombs or missiles) or simulate delivery of ordnance	Defensive tactics against airborne and ground threats -Aircraft maneuvering -Terrain following/terrain avoidance -Electronic countermeasures employment -Defensive countermeasures employment -Course deviations -Navigation and system management -Sensor employment -Airspeed changes -Communication -Ordnance delivery -High/low-altitude delivery (actual or simulated) Flight management and formation flying
Event No. 4	Avoid ground- or air-based threats; exit target area; reestablish airborne alert station or rejoin returning strike package	Navigation and communication Defensive tactics against airborne and ground threats -Aircraft maneuvering -Airspeed changes -Terrain following/terrain avoidance -Electronic countermeasures employment -Defensive countermeasures employment -Mission assessment and reporting -Course deviations Flight management and formation flying
Event No. 5	Exit combat airspace and return to base	Navigation and communication In-flight rendezvous with tanker aircraft Aerial refueling along established track Flight management and formation flying

Note: 1. Assumes a takeoff and landing as part of the overall mission.

The bomber aircrews from Ellsworth AFB and Minot AFB need to train as they will fight to ensure readiness for the full range of combat missions. All training to fulfill these goals derives from directives, training syllabi, and well-established programs. For the B-1s and B-52s, these training regimes as outlined in Air Force Instruction (AFI) 11-2B-1, *B-1 Aircrew Training,* December 2006, and AFI 11-2B-52, *B-52 Aircrew Training*, November 2006 include:

- **Mission Qualification Training.** Mission Qualification Training is designed to attain basic mission readiness status so crews meet the requirements to support combat taskings. The Mission Qualification Training syllabi for the base squadrons detail this information and requirements.
- **Ready Aircrew Program.** The Air Force established the Ready Aircrew Program to ensure that aircrews maintain combat mission readiness proficiency for all combat mission taskings. Ready Aircrew Program requirements can lag behind mission realities due to the rapid pace of mission changes. The Ready Aircrew Program Tasking Message, 11-2B-1 Volume 1, defines these requirements.



Mission Qualification Training and Ready Aircrew Program training for laser targeting is a new requirement for B-1 aircrews.

- **Weapons Instructor Course.** For B-1s and B-52s, the Weapons Instructor Course comprises a 6-month course created to develop advanced instructors for the combat air forces. This course requires advanced levels of integration with other aircraft and assets, as well as advanced maneuvering and tactics which require extensive airspace. Syllabi for the B-1 and B-52 Weapons Instructor Course programs present the specific training requirements.
- **Other Requirements.** The Mission Qualification Training, Ready Aircrew Program, and Weapons Instructor Course programs generate other training requirements including the use of defensive countermeasures (chaff and flares), conducting supersonic flight (B-1s only), employing advanced technology sensors, targeting systems, and performing actual munitions delivery employing both inert and live ordnance. The PRTC does not propose a live or inert range.

Table 2-4 lists some of the training events required under Mission Qualification Training and Ready Aircrew Program for B-1 aircrews. These events must be accomplished regularly for each aircrew to maintain combat-ready status. Some events need to occur on each sortie, while the aircrews may need to perform other events a few times per quarter or year. Nevertheless, each event needs to be undertaken consistent with a host of standards (e.g., speed, altitude, angle, duration, time of day). Failure to demonstrate minimum proficiency prior to currency date results in de-certification. Such a loss of combat-ready status prevents a highly trained individual from applying the training in the nation's interests.

Table 2-4. Ready Aircrew Program and Mission Qualification Training Mission Events (Page 1 of 2)

	In Powder River airspace				*In Proposed PRTC*			
Event	***Actual for 1-2 Aircraft***	***Simulated for 1-2 Aircraft***	***Actual for 4-8 Aircraft***	***Simulated for 4-8 Aircraft***	***Actual for 1-2 Aircraft***	***Simulated for 1-2 Aircraft***	***Actual for 4-8 Aircraft***	***Simulated for 4-8 Aircraft***
Weapon Delivery (no drop)	X				X		X	
High Altitude Weapon Delivery (no drop)	X				X		X	
Low Altitude Weapon Delivery (no drop)	X				X		X	
Formation Weapon Delivery (no drop)	X				X		X	
Unguided Ground Moving Target Indicator Weapon Delivery	X				X		X	
Guided Ground Moving Target Indicator Weapon Delivery (no drop)	X				X		X	
Unguided Mini-munitions/Radar Targeting	X				X		X	
Guided Mini-munitions/Radar Targeting	X				X		X	
Target Reassignment Exercise	X				X		X	
Time Sensitive Targeting	X				X		X	
Close Air Support Targeting Exercise With Ground Forward Air Controller/Forward Air Controller Airborne	X				X		X	
Actual Weapons Release		X				X		X
High Altitude Actual Weapon Release		X				X		X
Conventional Rotary Launcher (CRL) Heavy-Weight Actual Weapon Release		X				X		X
Actual Full Scale Weapons Delivery		X				X		X
Simultaneous Guided/Unguided Weapon Delivery		X				X		X
Joint Direct Attack Munitions High Altitude Bomb Run	X				X		X	
WCMD High Altitude Weapon Delivery (no drop)	X				X		X	
Joint Air-To-Surface Standoff Missile Delivery	X				X		X	
Actual Joint Direct Attack Munitions Release		X				X		X
Guided Full Bay Weapon Delivery		X				X		X
Guided Multiple Bay Weapon Delivery		X				X		X
Guided Multiple Target Weapon Delivery		X				X		X
Guided Weapon Reassignment	X				X		X	
Threat Activity	X				X		X	
Electronic Combat (A/S)	X				X		X	
Electronic Combat (A/A)	X				X		X	
Formation EA	X				X		X	
Supersonic Flight During LFE					X		X	
Flare Event					X		X	
Chaff Event					X		X	
Dissimilar Aircraft Tactics		X			X		X	
Terrain Following		X			X		X	
Visual Contour		X			X		X	

Table 2-4. Ready Aircrew Program and Mission Qualification Training Mission Events (Page 2 of 2)

	In Powder River airspace				*In Proposed PRTC*			
Event	***Actual for 1-2 Aircraft***	***Simulated for 1-2 Aircraft***	***Actual for 4-8 Aircraft***	***Simulated for 4-8 Aircraft***	***Actual for 1-2 Aircraft***	***Simulated for 1-2 Aircraft***	***Actual for 4-8 Aircraft***	***Simulated for 4-8 Aircraft***
Terrain Following Night/Instrument Meteorological Conditions (IMC)		***X***			***X***		***X***	
Terrain Following Mountainous		***X***			***X***		***X***	
Low Altitude Navigation	***X***				***X***		***X***	
Low Altitude Stream Formation	***X***				***X***		***X***	
Secure Voice	***X***				***X***		***X***	
In flight Secure Voice System Loading	***X***				***X***		***X***	
Secure Voice Satellite Communications	***X***				***X***		***X***	
Digital Communications Improvement (DCI)	***X***				***X***		***X***	
Have Quick Radio	***X***				***X***		***X***	
SAE/BLOS	***X***				***X***		***X***	
Anchor Refueling	***X***				***X***		***X***	
Night Vision Goggle (NVG) Aided Rendezvous	***X***				***X***		***X***	

2.2.1.2 Supersonic Training

Aircrew training must be realistic to be effective. A B-1 bomber aircrew is called upon to use the supersonic capability of their aircraft in a combat situation to defeat an enemy threat or in a defensive manner to avoid destruction. During an LFE, threat aircraft can achieve supersonic speeds and B-1 maneuvers could also achieve supersonic speeds. Supersonic speeds compress an engagement, affect aircraft handling characteristics, and drastically shorten reaction times. Supersonic speed is one part of aggregate maneuvers that may be employed in combat. Training at supersonic speed must be practiced by the aircrew as a whole to ensure they can adequately perform this realistic and challenging response required in combat. It is not enough for a crew to "feel" they can effectively execute the maneuvers; they must "demonstrate" supersonic maneuvers and be evaluated on the maneuvers. Aircrews must demonstrate the proper execution of supersonic maneuvers, such as reaction to threats, to be evaluated. Their performance and evaluation of that performance establishes a minimum standard required before an aircrew is allowed to proceed into a combat environment.

Bomber aircrews need to train for combat conditions, where both blue (friendly) and red (enemy) aircraft can be occupying the same airspace. Bomber aircrews need to practice reacting to engagements with fighter aircraft attacking at supersonic speeds at least down to 20,000 feet MSL. Without B-1 supersonic training, and using only subsonic engagements, a maneuver is a completely different event; a life or death engagement is a rapid chain of events, and a small difference at one key point can have a dramatic effect on the overall outcome. The capability to train during an LFE at realistic supersonic speeds can make the training experience relevant and of use for combat. Training to react realistically, utilizing supersonic speeds, increases the chances of aircrew survival in real combat. The supersonic LFE floor for B-1 aircraft would be 20,000 feet MSL. Fighters training with or against bombers need supersonic flight to simulate missile engagements. Fighters, such as F-16s, do not orbit/hold above

FL300. In practice they hold much lower, from 10,000 to 20,000 feet MSL. The minimum supersonic altitude becomes critical when they transition from hold/orbit to engagement. If an F-16 is scrambled from its orbit to engage a hostile aircraft, either bomber or other fighter, the fighter needs to quickly attain altitude and speed. The LFE floor for supersonic fighter maneuvers would be 10,000 feet AGL. In combat, the fighter uses supersonic speed to achieve optimum engagement altitude and speed. The fighter needs to be able to efficiently and quickly accelerate from lower altitudes.

2.2.1.3 Representative Bomber Flight Training Day

Section 2.1.4 describes the combat mission required for bombers and Section 2.2 describes the training needed for aircrews to be equipped for combat. Section 2.2.1.3 puts the training requirements in the overall context of the bomber mission and describes a representative bomber flight training day. Multiple scheduling considerations must be accommodated to fly one bomber training sortie. This example assumes no aircrew illness, weather delays, or aircraft mechanical cancellations.

The scheduling of flight crew, aircraft, and training airspace requires many planning hours by many people, days, weeks, or even months before the flight. All of these factors influence the need for the proposed PRTC.

Ellsworth AFB and Minot AFB both establish a long-term scheduling plan to allocate aircraft, support, and aircrews termed the "annual contract". The annual contract is the first step to plan aircraft availability, aircraft maintenance, and aircrew training. Each base develops the manpower, the base's flying window, airfield operations, and other scheduling factors (e.g., holidays). The Monthly Operations Plan is derived from and refines the annual contract to include numbers of sorties per day. The Monthly Operations Plan schedules the month's contracted sorties around overall wing commitments for that month. The weekly flying schedule breaks down the Monthly Operations Plan and compiles daily flying schedules that specifically assign aircrew names, aircraft tail numbers, aircraft configurations, takeoff and landing times, missions, and other elements.

The base develops the flow of a bomber's training day within the context of the scheduling process by coordinating multiple crew members, differences in aircraft modifications, and maintenance availability.

2.2.1.3.1 SCHEDULING AN AIRCREW

All aircrews do not have the same training or experience levels.

The first input to scheduling is aircrew proficiency training. The B-1 requires four crew members. The aircraft commander is a pilot. Pilots can be qualified as Evaluators, Instructors, Mission Ready, or Non-Mission Ready. Pilots can fly the aircraft unsupervised from either the right or left seat based on their qualifications. The Defensive Systems Officers and Offensive Systems Officers both function as Weapon Systems Officers; each must achieve qualification levels similar to Pilots: Evaluators, Instructors, Mission Ready, and Non-Mission Ready. The Weapon System Officers train to fly as both Offensive Systems Officers and Defensive Systems Officers, and although there are training events which can be accomplished from either seat position, there are also events which are seat position specific.

Each crew member must perform specific training requirements depending on their position and qualification level which drive the training events scheduled for each sortie. Commonly, each time a B-1 or B-52 takes off in a training flight; it consists of a unique crew. Even if the aircrew fly together repeatedly (which is rare in training), the requirements for individual crew members differ with each flight. Existing Powder River airspace assets cannot provide sufficient flexibility to accommodate the vast array of aircrew training requirements. Remote range complexes limit the capability to meet required training since so much flight time is absorbed in low-value commuting or transit time. Lack of consistent accessibility to remote ranges constrains the training aircrews can perform on any given day.

2.2.1.3.2 SCHEDULING AN AIRCRAFT

All B-1s and B-52s are not scheduled the same.

Aircraft modifications constrain the ability to schedule and fulfill training requirements. Like most aircraft, the B-1 continues to be upgraded with new hardware and software, with many of these modifications conducted during the past decade. Major modifications involve a long, incremental process to update the entire fleet. Some Ellsworth AFB aircraft available for training have updated modifications, and some await modifications. Aircrew training mirrors this incremental upgrade process by having some aircrew qualified in the new system, while others are still being trained and remain proficient on the old system. Combat theater commanders know about the upgrades and want aircraft and aircrews trained to be combat ready with the upgraded capabilities. If insufficient aircrews are qualified in the modified aircraft, achievement of combat objectives becomes difficult.

Balancing aircrew and aircraft upgrades is just the beginning of the scheduling process. Aircraft availability due to maintenance requirements comprises another factor, and even more so during an upgrade. For instance, theater commanders may request deployment of an updated aircraft, which means only aircrew qualified in a modified aircraft, can be deployed. Additionally, corresponding aircrew training would have to be accomplished in an updated aircraft, limiting which aircraft on station they have available to fly. If all the modified aircraft require maintenance, training cannot be accomplished. Routine maintenance of the aircraft requires many man-hours, and flight safety is first priority. Inspections also keep aircraft out of the training schedule and limit availability.

2.2.1.3.3 SCHEDULING A TRAINING AIRSPACE AND A RANGE

All airspaces and ranges do not provide the same training.

The missions, the individual and collective aircrew training requirements, the aircraft capabilities with upgrades, and the availability of maintenance capabilities define the requirements for a training airspace. The scheduler reviews all the factors above and seeks out an airspace and range which could accommodate the required training. Any shortfall in one airspace requires that an additional mission or missions be scheduled to achieve aircrew proficiency. The scheduler takes into consideration the airspace and range capabilities in the airspaces identified on Figure 1-1. Is the airspace large enough to accommodate B-1 performance capabilities? Are there altitude restrictions which would preclude low-level training below 2,000 feet AGL? Are these simulated threats to create realistic training scenarios? Is there a capability for visual targets? Will the aircrew be able to practice real defensive maneuvers such as deploying chaff and flares or accelerating to supersonic speeds? Are there ranges where inert or live munitions could be deployed? Are there dissimilar aircraft to train against or with as there would be in combat?

Additionally, other questions must be answered regarding range condition, weather, target types, etc. Once all of these questions are answered and airspace and range are identified, other scheduling considerations include: who has priority? When can the aircrew train? Typically there is a narrow scheduling window on highly desired and highly used ranges, such as Nevada Test and Training Range (NTTR) or Utah Test and Training Range (UTTR), which could be accomplished for realistic bomber training. The scheduler obtains or negotiates the required range window and everything is finally set. Until there is a 30 minute delay due to a minor aircraft malfunction, or developing weather, and resolving these problems delays the crew beyond their limited scheduled range time. Then the mission planning and scheduling starts all over again.

2.2.1.3.4 EXECUTING A TRAINING MISSION

This section assumes all the aircrew, airframe, and airspace scheduling requirements described in Sections 2.2.1.3.1, 2.2.1.3.2, and 2.2.1.3.3 are met and the mission can be executed. The mission actually requires 2 days.

Day 1 – Aircrew Mission Planning: After the squadron implements the monthly and weekly scheduling process, the aircrew scheduled to fly must mission plan the scheduled events. Mission planning begins in the morning with a squadron briefing that includes intelligence/threats, emergency procedures, and operations notes. Then, crew mission planning begins. The designated mission lead conducts detailed briefings on the training mission, airspace, and aircraft load. The crew researches air-defenses, studies campaign operations, analyzes targets, and develops a plan to mitigate threats while achieving mission objectives. Each aircrew plans to accomplish the maximum training events needed and possible within the scheduled parameters. Mission planning concludes with a series of detailed briefings, including a briefing of avoidance areas. Once mission planning is complete, the crew begins a mandatory 12-hour crew rest period which includes the opportunity for at least 8 hours of uninterrupted rest prior to flight.

Day 2 – Bomber Sortie: The actual flight period begins with the aircrew arriving at the squadron approximately 4 hours prior to scheduled takeoff. For a daytime mission, this generally occurs around 5:00 a.m. At the squadron, the crew checks out life support equipment, receives a weather briefing, reads Notices to Airmen (NOTAMs), reviews and signs off the Flight Crew Information File and Operations Notes, and files a flight plan. The aircrew then proceeds to the aircraft and accomplish pre-flight checklist items. Engine start, taxi, and take-off ensue, with winter operations extending this period for snow removal and/or aircraft de-icing activities.

After take-off, at 9:00 a.m. in our example, the flight proceeds to the scheduled airspace. During the time in the airspace, the aircrew executes the pre-planned profile designed to accomplish the maximum amount of training required by the aircrew. To replicate real combat conditions, the aircrew is often assigned new and unplanned tasks to test the aircrew's ability to adapt to mission changes and real-time developments. Typical training includes navigation, threat identification and reactions, combat maneuvering, aerial refueling, and simulated bombing, at both high and low altitude. New training elements include laser targeting, detailed target identification and tracking, and the recent combat requirement for networked and multi-spectral sensor targeting. Training can be accomplished as a single aircraft or as a formation of two aircraft. If two aircraft are scheduled to train together and one aircraft experiences ground-related aircraft maintenance or aircrew delays, then formation training elements can be negatively affected. Each bomber sortie has unique requirements which determine the amount of time in the planned airspace that will be needed to accomplish desired aircrew training. This description of the scheduling, planning, and executing of a training mission demonstrates the myriad of factors that must be considered to accomplish one aircrew training sortie.

The existing Powder River airspace poses limitations on executing such a training mission for more than one to two aircraft at a time. The existing Powder River airspace is too small to alleviate the problems, and use of the more distant complexes affects scheduling and training quality. The proposed PRTC is designed to meet as many training requirements as possible so that each sortie could accomplish the maximum possible aircrew training events for B-1 squadrons based at Ellsworth AFB and B-52 squadrons based at Minot AFB.

2.2.2 Limitations and Constraints of Current Training Opportunities

B-1s from Ellsworth AFB and B-52s from Minot AFB conduct training at Powder River airspace and at remote ranges and airspace throughout the west and portions of the Midwest (refer to Figure 1-1). Several limitations affect training for bombers from Ellsworth AFB and Minot AFB. The size and capabilities of the existing Powder River airspace prevent it from providing adequate training airspace for today's modified aircraft and new missions. These limitations drive the requirements for expanded local airspace capabilities. As a result of these limitations and constraints, current aircrew training requirements at Ellsworth AFB and Minot AFB are not being met in a timely or efficient manner. The limitations are discussed in this section.

2.2.2.1 Size of the Existing Powder River airspace

The size of the existing Powder River airspace (maximum 85 by 50 NM) constrains the amount and nature of training activities conducted with sensors and electronic capabilities. A mission of one or two bombers training to accomplish the range of mission requirements (see Section 2.2.1.1) effectively uses up the Powder River airspaces. Ellsworth AFB has a requirement to allow up to four missions of one to two aircraft each to launch and train at the same time. As a result, training activities which must occur at remote ranges use up aircrew and airframe training time with inefficient and unrealistic commuting. Recent conflicts and worldwide operations along with improvements in aircraft, munitions sensors, and tactics have increased the need for larger airspace and more realistic training within that airspace. New aircraft capabilities include the ability to address targets at distances in excess of 100 NM. Next generation surface-to-air missiles currently being marketed have a combat radius of 100 NM or more and can threaten all but the stealthiest aircraft.

The horizontal dimensions of the existing Powder River airspace prohibit adequate and realistic distance separation of multiple aircraft in the same airspace in order to support typical adversarial airborne engagements. The airspace is neither large enough for current radar system technology nor sufficient in size to allow the training aircrew to react appropriately.

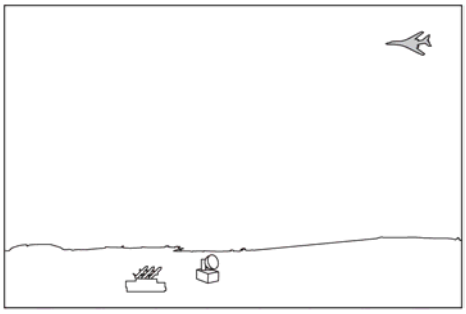
The existing Powder River airspace can support limited training for one mission of up to two B-1 aircraft because:

- Sensor distances have increased and "enemy" air-to-air and ground-to-air tracking capabilities exceed the dimensions of the Powder River airspace.
- Air-to-ground capabilities with new smart weapons involve distances which cannot be simulated in the existing Powder River airspace.
- Training activities of different aircrews cannot occur simultaneously and different formations cannot be segmented within the confines of the Powder River airspace.
- Maneuver (supersonic) and defensive (chaff and flare) training cannot be accomplished to realistically train aircrews to instantaneously react to threats.
- Dissimilar aircraft training with current threat and targeting capabilities cannot be accomplished within the Powder River airspace dimensions.

2.2.2.2 Training Restrictions within the Powder River Airspace

The current operating procedures for the Powder River airspace preclude the use of defensive countermeasures (chaff and flares) for all aircraft and prohibit supersonic flight by all aircraft. Increasingly complex surface-to-air threats require near instantaneous aircrew response to a threat by

immediately deploying countermeasures. The ability to use B-1 supersonic flight as a defensive tactic and the ability to respond to supersonic attacks by fighters are essential to modern combat. Supersonic flight for the B-1s forms an integral combat tactic, particularly when egressing from a target, avoiding ground threats, and escaping enemy aircraft during LFE dissimilar aircraft training.

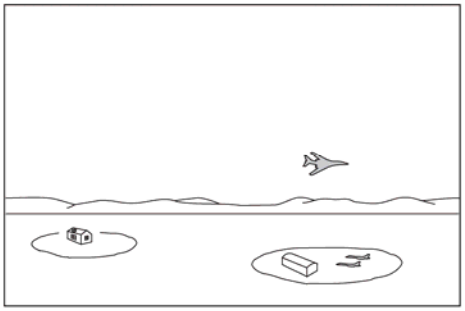


The inability to train with chaff and flares to neutralize threats and the inability to use supersonic speeds to escape opposing threats and/or during dissimilar aircraft training are serious restrictions to realistic training within the Powder River airspace.

Chaff and flare deployment represent necessary combat operations which bomber aircrews cannot perform in the local airspace. Chaff creates a brief electronic cloud of fibers thinner than a human hair to confuse enemy radar. Flares create a heat source to decoy heat-seeking missiles away from the aircraft. These countermeasures defend aircraft against enemy threats and are extensively used in combat. Training to employ these countermeasures in an effective and timely manner is essential for aircrews conducting almost any mission.

2.2.2.3 Avoidance Areas within the Powder River Airspace

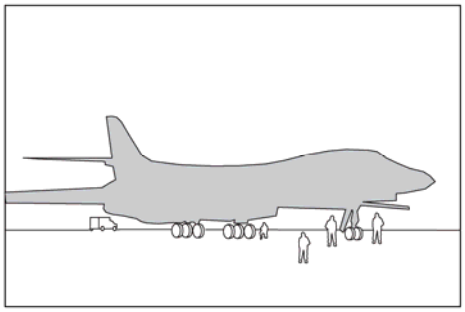
Ellsworth AFB has established avoidance areas under the Powder River MOAs to reduce noise and overflights above communities, ranches, or other noise-sensitive locations. The number and location of noise avoidance areas limit defensive reaction maneuvering in low-altitude training and create patterns that constrain diversity in some training. Avoidance areas force more training to higher altitudes. Avoidance areas establish and produce redundant training with reduced training quality. Avoidance areas would be designated for the proposed PRTC expanded airspace in accordance with the base's ongoing efforts to be a "good neighbor." Increased available airspace with different avoidance areas create the realistic, varied situations needed for quality training.



Numerous low-altitude avoidance areas require training aircraft to weave between the avoidance areas and/or climb over the areas while remaining 2,000 feet AGL and below.

2.2.2.4 Limitations on Sortie Generation

The current capability of the aircraft maintenance programs to generate sorties is limited by several factors. First, Air Force budget and personnel reductions have eliminated 200 aircraft maintenance personnel and decreased the average skill level of the maintenance personnel at Ellsworth AFB. Second, the longer an aircraft is flying, the more time is needed to perform mandated maintenance. In the long run, multiple 5-hour sorties will force 50-hour, 100-hour, and later inspections and maintenance more frequently than the same number of 3-hour sorties. This means that long commutes to remote ranges for training requires extended maintenance time and reduces the number of aircraft available for training on a daily basis.



B-1 ERCCs are crew changes with the engines running. The ERCCs are required to accomplish maintenance with available personnel and train for in-theater missions.

For aircraft sortie generation planning purposes, maintenance of a B-1 requires a minimum of 3.25 hours to prepare an aircraft after a morning sortie for an afternoon/evening sortie, assuming engines are shut off and restarted and no weapons loading is required. With training weapons loaded, that time increases to a minimum of 5 hours. These minimum maintenance hours are frequently exceeded to ensure a safe aircraft. The current airfield duty day is 17.5 hours, opening at 7 a.m. and closing at 12:30 a.m.

Maintenance requirements and aircraft turnaround time is a major factor in generating training sorties. As described in Section 2.2.1.3, a crew, aircraft, and airspace all are needed to achieve a successful training mission. When an aircraft returns from one training mission, a second crew can use that aircraft to train after maintenance is performed.

Several elements combine to make local airspace crucial to reduce maintenance time and enable more required training sorties.

1. When the aircraft lands and the engines are shut down, there is mandatory maintenance which takes 3.25 hours.
2. If the engines are not shut down, there can be an Engine Running Crew Change, and the aircraft can quickly be launched with a new crew for another training mission in local airspace. Ellsworth AFB currently schedules approximately 25 percent ERCCs

More local training airspace would permit a B-1 to land, keep engines running, exchange crew (refueling is not performed with engines running at Ellsworth AFB), take off with a lighter fuel load, and accomplish multiple training events with the new aircrew. If maintenance problems required an engine shutdown, the aircraft could still be maintained and be available for a local training mission within the 3.25 hour window. Adequate local airspace would improve training and reduce the ripple effect on aircrews that are unable to access an aircraft for training missions.

Certain elements can reduce the access to aircraft for an Engine Running Crew Change.

1. When equipment problems delay or cancel the first mission, the follow-on mission cannot occur and the ripple effect impacts the entire training plan.
2. The complexity of the aircraft systems means that small mechanical problems can occur and the risk of cancellation of a follow-on Engine Running Crew Change sortie is higher than a stand-alone mission.
3. If pre-flight checklist performance is needed to exercise full aircrew training, an engine shut-down and an engine start would be required for the full pre-flight checklist.

The additional training airspace permits the matching of aircrew who need training in specific qualification levels to appropriately upgraded aircraft and to fly those upgraded aircraft the training time needed in local airspace. The upgraded aircraft can quickly be available for other crewmembers needing the training. Adequate local training airspace substantially reduces conflicts with the entire training program and schedule.

2.2.2.5 Flying Hour Limitations

The amount of time for training is based on flying hours, with annual Air Force flying hours determined through the federal budgeting process. Available flying hours require aircrews to accomplish efficient, realistic training for each mission. Traveling longer distances to obtain required training only available in remote training airspace or departing the local area due to operational or scheduling conflicts with other aircraft decreases the time available to engage in realistic combat training. The efficiency of combat training depends upon three related factors: 1) the time required to depart from a base, conduct a sortie

that includes all the integrated training activities needed for a specific mission, and return to base; 2) the distance and flight time to and among the training assets (airspace and ranges) needed for that mission; and 3) the quality and quantity of the training accomplished. The longer the commute or transit time, the less time can be used for quality training. Transit or commute time provides limited training value.

Currently, aircrews from Ellsworth and Minot AFBs must fly a substantial portion (54 and 69 percent, respectively) of their training sorties at remote ranges and airspace like NTTR, UTTR, and the Mountain Home Range Complex (MHRC) (see Figure 1-1). The focus of quality training is on airspaces in Figure 1-1 which provide airspace altitudes, defensive countermeasures, supersonic maneuvers, threat emitters, and other realistic capabilities to meet B-1 and B-52 aircrew training requirements. Table 2-5 defines distances and approximate flight times (one-way) to the Powder River airspace and to remote training areas. A remote round-trip training mission expends more than twice as many flying hours as a local mission. For example, a B-1 flight to NTTR would expend 3.5 (2 x 1.75 hours) hours just to fly to the training complex and return to Ellsworth AFB.

Table 2-5. Flight Distances (NM) and Transit Times (HR) to the Powder River Airspace and Remote Ranges/Airspace

	From Ellsworth AFB		From Minot AFB	
Range/Airspace	***One-Way Distance (NM)***	***Time (HR)***	***One-Way Distance (NM)***	***Time (HR)***
Powder River Airspace	57	0.2	200	0.75
UTTR, Utah	484	1.25	675	2.00
NTTR, Nevada	614	1.75	825	2.60
MHRC, Idaho	535	1.5	765	2.25

Table 2-6 compares the actual B-1 aircrew training time at local and remote ranges. Examination of average sortie duration in Table 2-6 demonstrates the problem with a high proportion of use of quality remote training areas. For example, the average sortie duration for the B-1s from Ellsworth AFB to the Powder River airspace at 3.2 hours effectively achieves the same amount of mission training as the 5.1-hour average sortie duration to the remote training airspace. Aircrews expend a higher proportion of limited training hours in transit time to the remote complexes than to the local Powder River airspace. When B-1 aircrews must fly 54 percent of their sorties to remote locations, the amount of commute, or transit, time consumes between 2.5 and 3.5 times the number of flying hours required to have the same amount of training at the Powder River airspace. Similar factors apply to B-52 sorties out of Minot AFB, with training time at the remote complexes amounting to less than 50 percent of the average sortie duration. Combine this with the complexities of new weapons systems, increased aircrew training requirements, limited airframe availability, and remote range scheduling and it is clear that specific aircrew training and actual total training time would be greatly benefitted by quality local training airspace.

Table 2-6. Comparison of Bomber Transit Time and Training Time for Powder River Airspace and Remote Ranges/Airspace

Range/Airspace	***Aircraft/Base***	***Average Sortie Duration (HR)***	***Transit Time (HR)***	***Training Time (HR)***	***Percent Training Time[1]***
Powder River Airspace	B-1/Ellsworth	3.2	1.0	2.2	68%
	B-52/Minot	5.7	1.5	4.2	74%
UTTR, Utah	B-1/Ellsworth[2]	5.1	2.5	2.6	51%
	B-52/Minot	7.5	4.0	3.5	47%
NTTR, Nevada	B-1/Ellsworth[2]	5.1	3.5	1.6	31%
	B-52/Minot	7.9	5.2	2.7	34%
MHRC, Idaho	B-1/Ellsworth[2]	5.1	3.0	2.1	41%
	B-52/Minot	7.7	4.5	3.2	42%

Note: 1. Assumes no refueling.
2. Ellsworth used a remote range average sortie duration of 5.1.

2.2.2.6 Limits on Accessibility/Availability

Remote complexes give priority for aircraft from nearby bases and not to transients such as the B-1s and B-52s. The size and training restrictions of the existing Powder River airspace force 54 percent of the B-1 sorties and 69 percent of B-52 sorties to remote training locations to accomplish required training defined in the Mission Qualification Training, Ready Aircrew Program, and Weapons Instructor Course. Scheduling time at these complexes proves problematic and lacks flexibility to accommodate contingencies such as aircraft delays described in Section 2.2. A delay in launch of a B-1 at Ellsworth AFB or a B-52 at Minot AFB or a weather delay en route may miss the training window at a remote range and not have access to any quality training for that mission. These limits on accessibility further reduce the ability of the B-1s and B-52s to achieve readiness requirements.

2.2.2.7 Electronic Attack Assets

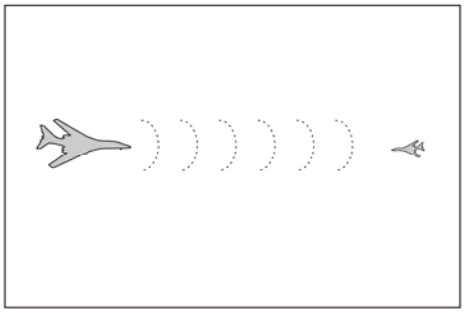
The Belle Fourche ESS and the associated sites for threat emitters were established to meet Cold War era training requirements. The electronic attack assets of the Powder River airspace lack realism and flexibility for current and future conflicts. The emitter sites are located mostly along old Strategic Air Command MTRs near the Powder River airspace and in its southern limits (see Figure 2-3). The threat emitters do not present the newest systems nor can they pose realistic threats to more than one to two aircraft training for the new B-1 or B-52 missions. In real conflicts, an enemy relocates threats to destroy U.S. aircraft. The existing threat emitters offer limited flexibility to relocate as changing threats or to reflect realistic combat conditions. The existing electronic attack assets provide for some needed training and are being upgraded, but airspace distances limit maneuver options and drive training scenarios that become repetitive. The resulting aircrew familiarity and habituation does not provide realistic combat challenges. In combat, mobile threats regularly change locations to challenge and defeat aircrews. With expanded airspace the electronic attack assets could be addressed from greater, more realistic distances and aircrews could address the threats from different locations.

2.2.2.8 Target and Ordnance Delivery Constraints

The Powder River airspace includes several simulated targets, although none provide Close Air Support capabilities or urban mockups required for today's missions. Close Air Support training often needs to occur in an urban setting and a mock-up of an urban setting is frequently constructed with shipping containers for simulated training. No portion of the Powder River airspace permits live or inert munitions delivery. The proposed PRTC does not include live or inert weapons delivery and aircrews would continue to fly to remote ranges to accomplish required weapons delivery training.

2.2.2.9 Effects of Technology Upgrades

As described in Section 2.2.1.3, all aircrews, all bombers, and all training airspaces are not equal. The B-1s and B-52s have received, are undergoing, or will receive multiple technology upgrades that increase targeting effectiveness, communications and coordination, and functionality in large force operations. The upgrades include new guided munitions, laser targeting capability, direct satellite communication and data download, and new radar. Each of these incremental changes expands the training requirements and increases the size of the training airspace needed to accomplish the requirements. These upgrades



New B-1 capabilities include the ability to identify potential threats and targets at substantially greater distances than previously. This capability effectively reduces the number of aircraft which can train in the existing Powder River airspace.

affect airframe availability, sortie generation, and the ability of individual aircrew to meet qualifications. For example, the Sniper Advanced Targeting Pod currently being used by the B-1 fleet is in extremely limited supply. For B-1 aircrew training with the Sniper Pod sensors, clear view of the ground is required. With only a limited amount of airspace to conduct training, as is the case within current Powder River A/B airspace, weather can often times not be avoided and training is degraded. This limitation also occurs with all other upgrades. Access to bombers with the needed technology upgrades is substantially improved if those aircraft are training locally and not expending hours commuting to remote ranges.

2.2.2.10 Summary of Limitations and Constraints

This suite of limitations and constraints, described in Sections 2.2.2.1 through 2.2.2.9, make it difficult for B-1s from Ellsworth AFB and B-52s from Minot AFB to maintain aircrew readiness for combat. Since these bombers play an essential role in national defense and Overseas Contingency Operation execution, there is a need to rectify the limitations. The Air Force needs to add to and reconfigure local airspace to accommodate the training requirements. Establishing the proposed PRTC would fulfill this need and reduce almost all of these limitations and constraints.

2.3 ALTERNATIVE IDENTIFICATION PROCESS

The alternative identification process specified needed criteria and applied those criteria to currently available training assets. Chapter 1.0 presents a summary of current training airspace assets in Figure 1-1. Locally available Powder River airspace imposes numerous limitations on the Air Force's ability to support realistic training for bomber aircrews as explained in Section 2.2.2. One to two bombers training to use the current sensors and technologies the aircrews face in real world conflicts effectively use up the existing Powder River airspace. The existing Powder River airspace does not provide practical training for realistic coordination and deconfliction situations, provides no opportunities for training with defensive countermeasures or supersonic flight, and results in excessive commuting to non-local training as bomber aircrews fly to remote complexes to achieve a majority of their training requirements. The single mission structure and limited mission task training of the Powder River airspace cannot provide the sequenced and diverse training needed by combat aircrews.

The Air Force developed criteria to address training deficiencies and limitations and define a set of reasonable alternatives which could support required training. The Air Force determined that a reasonable alternative should meet the following criteria. The sections in parentheses identify where, in this EIS, each criterion is addressed.

- Utilize existing training airspace and ground-based assets to the extent possible while meeting training requirements (AFI 13-201) (Sections 2.3.1.1 and 2.3.2.1);
- Provide airspace of sufficient size and volume to support the concurrent training needs of multiple B-1s and B-52s (Sections 2.3.1.2 and 2.3.2.2);
- Maximize training time and sortie generation capability for diverse new missions through the use of finite flying hours and access for the B-1s and B-52s (Sections 2.3.1.3 and 2.3.2.3);
- Provide connected airspace, (a maximum of once per quarter), to support realistic LFE training with approximately 20 aircraft of various aircraft types (Sections 2.3.1.4 and 2.3.2.4);
- Avoid or limit, to the extent possible, potential conflicts with civilian air traffic (Sections 2.3.1.5 and 2.3.2.5); and
- Avoid or limit, to the extent possible, safety and environmental concerns (Sections 2.3.1.6 and 2.3.2.6).

2.3.1 Explanation of Alternative Identification Criteria

2.3.1.1 Existing Military Airspace

Airspace comprises a valuable and finite national resource which is the responsibility of the Federal Aviation Administration (FAA). The FAA seeks to balance the different needs of airspace users. The Air Force seeks to use existing military airspace to the extent possible to meet the purpose and need. The Air Force evaluated the size, structure, and location of existing MOAs, ATCAAs, and MTRs to maximize their utility.

2.3.1.2 Airspace Size and Volume

The airspace must be of adequate size and volume to allow bomber aircrews to conduct a full range of tactics and maneuvers while employing almost all capabilities of the aircraft except actual munitions delivery. Any candidate airspace must have the capability to simultaneously support three to four two-ship training missions incorporating the full suite of B-1 and B-52 missions. To meet the defined needs, the horizontal and vertical extent of the airspace must allow for realistic engagement distances with hostile threats, especially with regard to new targeting and sensor identification technology. Each airspace unit for the three to four two-ship training missions would need to measure approximately 75 by 75 NM and have the ability for airspace from 500 feet AGL regularly to FL260 and potentially to FL600 for LFEs.

The B-1 has a requirement to exercise terrain following radar capabilities. It would be highly desirable for the airspace to include the capability for mountainous terrain following training. Mountainous terrain following requires that an aircrew employ B-1 mountainous terrain following capabilities over terrain which varies more than 1,000 feet in elevation within 10 NM (AFI 11-2B-1V1).

2.3.1.3 Maximize Training Time and Sortie Generation

Effective and efficient training requires aircrews to expend flying time performing realistic training with the upgraded B-1 and B-52 aircraft on real world missions described in Section 2.1.1. Local airspace increases the proportion of training time per sortie, maintains realistic training with a lower average sortie duration, reduces transit time, maximizes upgraded aircraft utilization, and provides for the myriad of new mission training now required of aircrews. The airspace must avoid lost training missions at remote training complexes due to scheduling priorities of these training complexes. All training missions must also be accomplished within an average of 240 flying days per year.

Sortie generation and sortie effectiveness are critical elements in readiness. Factors which influence sortie generation include maintenance, crew qualifications, and aircraft modifications. Restrictive range schedules reduce the effectiveness of sorties and preclude a base's ability to respond to contingencies. Sortie effectiveness is reduced because:

- Range schedule inflexibility requires the aircrew to be ready with a mission, the needed airframe be readied, and the airspace to be available. Inflexible training airspace schedules require a set launch time and eliminate the ability of maintenance operations to perform steps to ready an aircraft in advance for a mission at a later time. Heavily used high quality remote ranges have inflexible schedules.
- Weather changes often dictate real-time mission changes. A restricted and fixed time for training in airspace hundreds of miles away results in the loss of dozens of sorties per year and impacts aircrew readiness.
- Flexible scheduling is needed to meet real world training requirements. Remedial mission accomplishment is required if a student fails a mission. Developments in a war zone may require a

squadron to perform their training mid-week. Equipment failures occur, emergencies beneath the airspace may preclude training, and sickness or family emergencies may result in personnel mission shifts. Sortie generation and training need flexibility to respond to such contingencies.

- There is a limited number of B-1s and an even more limited number of B-1s with continually updated weapons and sensor systems needed for the specific training described in Chapter 1.0. Using these airframes to commute to distant ranges with restricted schedules makes them unavailable for realistic training to meet wartime requirements.

The proposed military training airspace must be near enough to allow flexibility in launching sorties and be scheduled for the bombers that need it. The proposed airspace needs to permit multiple daily sorties of mission capable aircraft to address both realistic combat scenarios and limitations on maintenance capabilities.

2.3.1.4 Provide for Connective Airspace

In combat conditions, a bomber does not operate alone or only with one other bomber. A bomber aircrew is one element in a composite whole during an LFE which includes different types of aircraft with sensors and weapon systems. An F-16 may be performing ground attack to support a coalition ground force and be running short of fuel while simultaneously a B-1 may be vectored to continue the attack. Meanwhile, an F-15 or F-22 flying top cover may have to defend the bomber from enemy fighters and a B-52 may be suppressing enemy defenses. Opposing surface-to-air and air-to-air threats, at speeds including supersonic, require rapid defensive response training, sometimes at supersonic speeds. Training as a single force is the only way such integrated communications and choreography can be accomplished. With today's and tomorrow's sensors and weapon capabilities, such LFEs require extensive airspace. The training airspace needs the provision to combine, a maximum of once per quarter, smaller airspace units into an overall training airspace with the capability to support an LFE of approximately 20 aircraft of various aircraft types.

2.3.1.5 Reduce or Limit Conflicts with Civil Aviation

The U.S. government has exclusive sovereignty over the nation's airspace (49 U.S.C. Sec. 40103(a)(1). The FAA plans, manages, and controls the structure and use of airspace to make it as useful as possible for all types of aircraft. The Air Force, in working with the FAA, recognized that proposed airspace should limit or reduce the potential for conflicts with the structure and use of the airspace system by civil aviation. Avoidance of conflicts with airports, jet routes, federal airways, and other airspace units represents a priority for identifying a viable alternative.

2.3.1.6 Limit Safety and Environmental Conflicts

As conscientious users of the National Airspace System and good neighbors, the Air Force considers safety and environmental factors in any proposal. Provisions need to be in place to identify certain locations as flight avoidance or noise sensitive areas. Some examples of potential areas include civilian airports, populated areas, power plants, recreation areas, and Native American cultural sites. Flight activity also needs to allow for seasonal, altitude, and location avoidance, such as for specific outdoor activities, emergencies such as fire fighting and life flights, and certain wildlife species during specific times of the year. Training aircrews would be briefed to avoid these areas as applicable. Avoidance procedures reduce the potential for safety or environmental impacts. The airspace needs to offer multiple segments to allow training in one area while applying avoidance restrictions in another.

2.3.2 Application of Criteria to Develop the Proposed Action and Alternatives

The criteria described in Section 2.3.1 were applied to define a proposed action and alternatives which could meet training requirements. The selection criteria were applied to identify the location and configuration of required training airspace.

2.3.2.1 Existing Military Airspace

The Air Force seeks to use existing military airspace to the extent possible. Existing military airspace presented in Figure 1-1 was reviewed to determine what existing airspace could be the focal point for expanded airspace to meet the purpose and need for bomber training with new technologies, sensors, and missions. The western ranges at MHRC, UTTR, and NTTR are existing ranges with all training capabilities needed for bombers. These ranges are distant and require extensive commute time. Northern and eastern MOAs including the Lake Andes MOA, the Tiger and Devils Lake MOAs, and the Hays MOA do not provide training capabilities for current bomber systems and generally do not have low-level training capabilities with the dimensions needed for high-speed bomber training.

The need to maximize sortie generation, the need for training time with new weapon systems, and the need to combine bomber aircrew, airframe, expanded mission training all identified the existing Powder River MOAs and ATCAAs as a focal point for any proposed action or alternatives. The current Powder River airspace MOAs and ATCAAs comprise the only existing airspace managed and controlled by Ellsworth AFB where both B-1 and B-52 bombers receive priority access. Situated between the two bases, 57 NM northwest of Ellsworth AFB and 200 NM southwest of Minot AFB, the Powder River airspace permits ready access for training. The Powder River airspace best meets the requirement for existing airspace which could be used as a focal point for airspace modifications to meet the purpose and need.

2.3.2.2 Airspace Size and Volume

Airspace configuration defines the size and volume of the airspace. Infrastructure under the airspace needed to support realistic training missions is also included in this criterion. Configuration consists of four attributes: structure, horizontal size, vertical size, and shape. Each of these attributes must adhere to the criteria and support fulfillment of the purpose and need.

- **Structure**: The airspace must include the capacity to link a MOA and overlying ATCAA. Alone, neither a MOA nor an ATCAA would provide the vertical extent needed for training. MOAs extend to but not including FL180 and ATCAAs extend from FL180 and above. B-1s and, especially B-52s, use higher altitudes extensively in combat and training. Linking the MOAs and ATCAAs vertically permits continuous maneuvering and promotes realism. Ellsworth AFB has a history of working closely with Air Route Traffic Control Centers (ARTCCs) to schedule and use the Powder River MOA/ATCAA combinations needed for a specific training mission. Based on the need for training three to four bomber formations, the airspace structure needs to include three to four sets of MOAs and ATCAAs. Individual MOAs and ATCAAs could be used to increase training opportunities and flexibility. Horizontal linkage of MOAs and ATCAAs for an LFE during an estimated 10 days per year for 1 to 3 days per quarter expands the training area size to accommodate more complex training activities with various aircraft types. To accomplish this linkage, the structure would need bridges or Gap MOAs and ATCAAs. Linking selective airspace segments would allow the Air Force to work with ARTCCs to configure the airspace for mission training requirements while reducing impacts to non-military users. Linking multiple airspaces

or the entire airspace would permit aircrews to conduct LFE engagements of approximately 20 aircraft of various types training together in simulated combat and at realistic distances for new aircraft sensors.

- **Horizontal Size**: Each MOA and ATCAA needs to offer sufficient size to accommodate a minimum of two B-1s conducting training simultaneously. As a large aircraft with advanced long range multi-spectral sensors and supersonic capabilities, the B-1 requires a large maneuvering area. Although all four MOA/ATCAA combinations need not be exactly the same size, each should measure approximately 75 NM for both its length and width. Existing radars and targeting equipment in fighters and bombers allow detection of aircraft at distances in excess of 100 NM. Proposed LFEs use long-range air-to-air activities and need a combined airspace of approximately 150 by 300 NM.
- **Vertical Size**: B-1s and B-52s must conduct missions that transit and operate at altitudes from below 2,000 feet AGL to altitudes above FL450. B-1 training is primarily below FL260. Low-altitude terrain following and avoidance is an important B-1 mission. The B-1 terrain following and terrain avoidance system performs optimally at 500 to 2,000 feet AGL. The B-52s train primarily at high altitudes (above 20,000 feet MSL). Aircraft which could participate in a maximum of once per quarter LFE training would use altitudes up to 60,000 feet MSL. The vertical extent of the airspace must have the potential to extend from 500 feet AGL to 60,000 feet MSL for LFEs.
- **Shape**: The shape of the airspace reflects both operational requirements and avoidance of conflicts with civil aviation. Individually and collectively, the MOAs/ATCAAs must be configured to permit the repertoire of maneuvers performed by the bombers. They need not be uniform in shape, but should provide for both offensive and defensive maneuvering and multi-aircraft engagements. In addition, the Air Force considered potential conflicts with major airports and airspace used for civil aviation in order to define the shape of the airspace.

AFI-11-2B-1 Vol 1 and AFI 11-2B-52 Vol 1 give training information for Mission Commander Sortie, Composite Force Training, Joint Force Training (B-1), Composite Force Training, and Joint/Composite Training Sortie (B-52). These instructions form the basis for the LFE requirement. LFE training a maximum of once per quarter could only be accomplished in airspace sized for today's sensors which have the capability to acquire targets at distances in excess of 100 miles.

Infrastructure includes ground-based assets to replicate threats and create a realistic training environment. As noted in Section 2.1, Powder River airspace contains a substantial investment in threat emitters and no-drop targets to replicate real-world conditions. Distant western ranges are in high demand because they have the airspace size, volume, and infrastructure attributes. Eastern airspaces do not include the attributes or infrastructure needed for bomber real-world training. The proposed expansion of Powder River airspace to become PRTC would achieve the airspace attributes, use existing infrastructure, allow for new and redistributed infrastructure assets, and create varied threat scenarios to challenge training aircrews.

2.3.2.3 Maximize Training Time and Sortie Generation

Existing airspace meeting the needs of the bombers must minimize the flying hours expended for low-value commute or transit time. Figure 1-1 describes other ranges and existing MOAs within the general region of Ellsworth and Minot AFBs. Western ranges are 484 to 614 NM from Ellsworth AFB and 675 to 825 NM from Minot AFB (Table 2-5). The distance to these ranges maximizes commute time rather than training time. The Hays MOA in northern MT is approximately 380 NM from Ellsworth AFB and 280 NM from Minot AFB. The MT Air National Guard (ANG) controls, schedules, and uses the Hays

MOA. MT ANG aircraft receive scheduling priority. Other MOAs in the region include the Devil's Lake MOAs and Tiger MOAs in ND. The Devil's Lake and Tiger MOAs are 225 to 275 NM from Ellsworth AFB and 40 NM from Minot AFB. These MOAs do not have airspace volume or infrastructure to maximize training times for B-1 aircrews. B-52 aircrews can, and do, receive a limited level of training in these airspaces without realistic threats.

The Powder River airspace is located between Ellsworth AFB and Minot AFB (see Figure 1-1). Expanding the Powder River airspace would reduce transit time to realistic training locations for both bomber bases. As noted in Section 2.2.2.5, 68 percent of an average B-1 sortie to the Powder River airspace consists of training time. Sorties to more remote complexes (e.g., UTTR) achieve 51 percent or less mission training time because the longer sorties (5.1 v. 3.2 hours) require extensive commuting. No existing airspace occurs within a distance that would permit reduction of commute time. Powder River airspace would serve as a suitable anchor for the proposed PRTC due to its proximity to the bases. Expanding Powder River airspace would maximize training and allow more sorties to conduct training locally, with an average sortie duration of 3.2 hours instead of 5.1 hours (see Section 2.2.2.5).

Maximizing sortie generation and Engine Running Crew Change can only be accomplished with local airspace. The further the bombers fly, the less they have the capability to "turn" sorties. Distance limits all the factors that would permit increased sortie generation. The Powder River airspace is the only airspace as a focal point which would maximize training time and sortie generation.

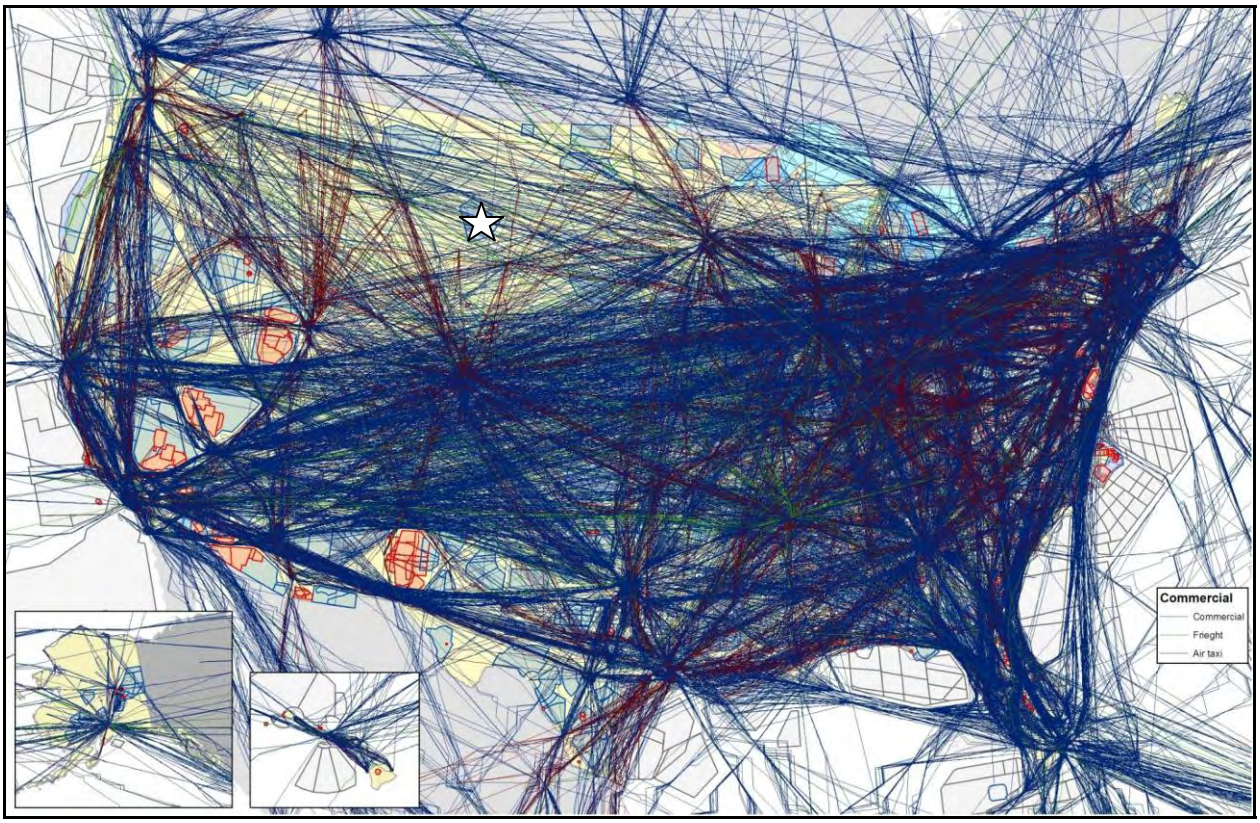
2.3.2.4 Provide for Connected Airspace

Proposed airspace improvements need to have the ability to perform realistic training with LFEs. The western ranges provide such capabilities and are heavily scheduled for such exercises as Red Flag at NTTR and for testing weapon systems such as the Joint Direct Attack Munition at UTTR or missiles at White Sands Missile Range. The northern and eastern MOAs lack existing infrastructure and volume for current training and do not have the ability for connected airspace which would permit realistic LFE training.

Powder River airspace can be transformed into the PRTC with the ability to incorporate Gap MOA/ATCAAs to connect the airspace units, with FAA scheduling, to provide for approximately 10 days per year of LFEs scheduled 1 to 3 days per quarter. The LFE would be scheduled by NOTAM and the estimate of expected LFE use would be 4 hours per LFE day. The local airspace LFE would permit realistic training for approximately 20 aircraft of various types operating at speeds up to, and including, supersonic flight. The local rapid turn-around of B-1 and B-52 aircraft would provide the needed real-world training for aircrews before they entered combat.

2.3.2.5 Reduce or Limit Conflicts with Civil Aviation

Proposed airspace improvements need to reduce or limit conflicts with civil aviation. Ellsworth AFB conducted preliminary review to identify potential conflicts with other elements of the National Airspace System. Figure 2-5 presents a U.S. commercial airspace flow map for a 12-hour period on a representative day. This level of information was used for screening of alternatives. More details on FAA traffic are presented in Section 3.1 of this EIS. Airspace south of the Powder River airspace is heavily traveled by commercial aircraft that dominate the available space. Areas north, west, and northeast of the Powder River airspace have capability to support military training aircraft while reducing the potential for schedule impacts to civil aviation.



Source: FAA, Commercial Transponder Tracks: 0800-1800 on 19 October 2006.

Figure 2-5. Commercial Air Traffic Constraints on Powder River Airspace

As presented in Figure 2-5, there is commercial traffic through and above the existing Powder River airspace and the proposed PRTC. The current Powder River and Gateway ATCAAs are normally used up to FL260, and the Black Hills ATCAA extends to FL230. The majority of the commercial aircraft which overfly the existing Powder River airspace are high altitude flights above FL300.

The scoping process conducted in 2008 gathered public and agency input on the proposal. More information on the scoping process is described in Section 2.9. Concern was expressed during the scoping process that the PRTC would require extensive and costly rerouting of commercial traffic. Ellsworth AFB operates with a Letter of Agreement in the Crossbow ATCAA and has demonstrated the ability to work with ARTCCs to schedule airspace as required for training. The Air Force proposes to work with ARTCCs under similar day-to-day scheduling in the expanded PRTC airspace. The higher altitudes with continuous airspace would be primarily focused on the maximum once quarterly LFEs of 1 to 3 days.

Neither the B-1s nor the B-52s train at altitudes up to FL600, although fighters which would participate in LFEs operate to FL600. B-52 profiles normally require an approximate 2,000 foot altitude block in the high FL300s and low FL400s. B-1s do not operate tactically at those altitudes. During primarily B-52 training, vertical blocks would typically be requested in heavy commercial traffic altitude sectors above FL300. Since B-52s are Reduced Vertical Separation Minimum non-compliant, ARTCCs allocates 6,000 feet above FL290 to have a B-52 2,000-foot training block with 2,000 feet above and below the 2,000-foot training block. B-1s are also Reduced Vertical Separation Minimum non-compliant, so any operations above FL290 would require a similar buffer from non-participating traffic. As experienced with Powder River airspace and briefed to the FAA and commercial airlines, the B-1 is expected to train below FL260 an estimated 99

percent of the time (see Section 2.7.2). ARTCCs would be contacted and ATCAA airspace would be requested for B-1 or B-52 training in ATCAAs, especially above FL260.

2.3.2.6 Reduce or Limit Safety or Environmental Conflicts

With any airspace proposal, the Air Force would identify certain noise sensitive and safety-related locations as permanent or seasonal avoidance areas. Airports are avoided by specified altitudes for safety, and altitude limitations on seasonal overflight of migratory areas are done to avoid safety and environmental conflicts. The Air Force would establish temporary or seasonal avoidance areas or could adopt other measures identified in consultation with affected Tribes to reduce intrusive impacts. Safety also includes making training airspace available for emergencies. In cases of emergency, such as firefighting, air ambulance, law enforcement, or in-flight emergencies in an active MOA, the Air Force would immediately respond to Air Traffic Control (ATC) direction and relocate bomber aircraft to another airspace away from the emergency. In extreme cases, the Air Force would cancel a training mission and return to base to support ATC emergency requirements.

Avoidance areas and emergency procedures would apply to any airspace considered for expanded training. The availability of nearby or adjacent airspace elements where a training mission could be directed would serve to protect safety and permit completion of the aircrew training mission. Existing northern and eastern MOAs do not have the ability to expand and would require that the training mission be cancelled. The proposed PRTC would allow for emergencies and provide flexible airspace to achieve training objectives.

Ground and general aviation safety would apply to any airspace. During scoping meetings, public and agency concerns were expressed about potential safety and environmental conflicts. Such conflicts could include the startle effect of low-level B-1 training and sonic booms. B-1 or B-52 training at altitudes 2,000 feet AGL and below could result in startle effects. Additionally, sonic booms from B-1 supersonic flight above 20,000 feet MSL and fighter supersonic flights above 10,000 feet AGL, both limited to 10 days per year of LFEs, could also result in startle effects upon residents or visitors to the areas under a training airspace. The Air Force training requires airspace use 2,000 feet AGL and below as noted in Section 2.1.1. A B-1 could train 2,000 feet AGL and below approximately 15 to 20 minutes during any individual training sortie, and that low-level training could occur anywhere within an active MOA. The Air Force includes in the Proposed Action and action alternatives the requirement for notification to the appropriate ATC whenever the military aircraft enter or exit the MOA. Notification that the military aircraft have completed low-level training would allow ATC to inactivate MOA altitude segments and direct IFR traffic through the altitude segment even if military aircraft are still utilizing other MOA altitude segments. This would permit civil aircraft pilots or others with access to ATC information to be able to learn the active or inactive status of a MOA.

Safety includes airspace stand-off distances around airports and Federal (Victor) airways. Public airports under any airspace alternative would be avoided by a 3 NM diameter circle with an altitude of 1,500 feet AGL. The avoidance areas would be mapped on FAA aeronautical charts and noted in pilot briefings. The proposed PRTC has Gap MOAs and ATCAAs which would be activated for LFEs a maximum of once a quarter. The proposed Gap MOAs/ATCAAs have been adjusted in dimensions at FAA's request to reflect communication capabilities in the region. The Gap MOAs/ATCAAs are proposed to provide for Victor Airway corridors for civil aviation during normal military training. During scoping, the FAA expressed concern that some proposed MOAs could interfere with the safety of Billings, Bismarck, and Dickinson airports. The Air Force has revised the PRTC aeronautical proposal to address FAA's concerns and reduce the potential for conflicts.

2.3.2.7 Summary Application of Selection Criteria

The Powder River airspace and surrounding area represent the only location with existing airspace that meets the need for the proposal and the selection criteria. Table 2-7 summarizes the application of these selection criteria to locations in Section 2.3.2 and includes the alternatives considered but not carried forward from Section 2.3.3 below. As noted in Section 2.2.2, the existing Powder River airspace can support only one formation of aircraft (one to two B-1 aircraft with new technologies) at any given time. The proposed PRTC would provide up to four appropriately-sized airspace blocks that could support four formations of training aircraft. PRTC would provide airspace of sufficient size and volume, allow for use by the bombers, maximize training time, have LFE capability, reduce the potential for conflict with civil aviation, and include steps to limit safety and environmental conflicts. The proposed PRTC, with management and mitigations, would meet the selection criteria identified.

Table 2-7. Summary of Application Criteria to Alternative Selection (Page 1 of 3)

	SELECTION CRITERIA						
Alternative Considered	***Existing Airspace***	***Size and Volume***	***Training Time and Sortie Generation***	***Provides for LFE***	***Avoids Civil Air Conflicts***	***Avoids Safety or Environmental Conflicts***	***Carried Forward for Analysis***
Powder River airspace expanded to PRTC Alternative A	Yes	Meets realistic training requirements for 4 to 8 aircraft; provides topography for training	Yes	Yes	Some: Schedules specific activation in 4 MOAs	Establishes avoidance areas in 4 MOAs, increases flexibility for avoidance	Yes
Powder River airspace expanded to PRTC Alternative B	Yes	Meets some requirements with limited terrain following	Yes with some flexibility	Yes	Some: Schedules activation in 3 MOAs	Establishes avoidance areas in 3 MOAs, limited flexibility for avoidance	Yes
Powder River airspace expanded to PRTC Alternative C	Yes	Meets many requirements , provides terrain following	Yes with some flexibility	Yes	Some: Schedules activation in 3 MOAs	Establishes avoidance areas in 3 MOAs, limited flexibility for avoidance	Yes

Table 2-7. Summary of Application Criteria to Alternative Selection (Page 2 of 3)

SELECTION CRITERIA							
Alternative Considered	***Existing Airspace***	***Size and Volume***	***Training Time and Sortie Generation***	***Provides for LFE***	***Avoids Civil Air Conflicts***	***Avoids Safety or Environmental Conflicts***	***Carried Forward for Analysis***
Powder River airspace expanded to PR-1A/1B MOAs and ATCAAs, PR-2 MOA and ATCAA, and Gap A MOA and ATCAA	Yes	Does not meet size or volume for three to four two-ship training; provides topography for terrain following training	Limited flexibility for realistic training	No, does not provide realistic LFE training distances with current weapon systems	Some: Schedules activation in 2 MOAs	Establishes avoidance areas in 2 MOAs, limited flexibility for avoidance areas; concentration of new flights over reservations	No: Limited size and volume, does not meet training purpose and need, limited flexibility for impact avoidance
Powder River airspace expanded with additional PR-3 MOAs and ATCAAs	Yes	Does not meet size and volume for three to four two-ship training	Limited flexibility for realistic training	No, does not provide realistic LFE training distances with current weapon systems	Some: Schedules activation in 2 MOAs	Establishes avoidance areas in 2 MOAs, limited flexibility for avoidance	No: Limited size and volume, does not meet training purpose and need
MHRC	Yes	Yes, limited topography for terrain following training	No	Schedule and access constraints	Yes	Yes	No: Requires extensive commute; inadequate training time
UTTR	Yes	Yes	No	Schedule and access constraints	Yes	Yes	No: Requires extensive commute; inadequate training time
NTTR	Yes	Yes	No	Schedule and access constraints	Yes	Yes	No: Requires extensive commute; inadequate training time
Lake Andes MOA	Yes	No	No	No	Some	Some	No: Inadequate volume
Tiger/Devils Lake MOAs	Yes	No	No	No	Some	Some	No: Inadequate volume; distant
Hays MOA	Yes	No	No	No	Some	Some	No: Inadequate volume; distant
PRTC with Bombing Range	No[1]	Yes	Yes	Yes	Some	No	No: Specific training can use existing ranges
Increase Funding for Commuting	Yes	Yes	No	Schedule and access constraints	Yes	Yes	No: Requires extensive commute; inadequate training time

Table 2-7. Summary of Application Criteria to Alternative Selection (Page 3 of 3)

SELECTION CRITERIA							
Alternative Considered	***Existing Airspace***	***Size and Volume***	***Training Time and Sortie Generation***	***Provides for LFE***	***Avoids Civil Air Conflicts***	***Avoids Safety or Environmental Conflicts***	***Carried Forward for Analysis***
Expand Simulation	Yes	No	No	No	Yes	Yes	No: Does not provided required training
Relocate Aircraft	Some: Capacity limited	Some: Capacity limited	Some: Capacity limited	Some: Capacity limited	Yes	Yes	No: Does not meet purpose and need
B-1 and fighter supersonic to 10,000 feet AGL	Yes	Yes	Yes	Yes	Some	No: B-1 size creates excessive overpressure from supersonic flight at 10,000 feet AGL	No: Creates excessive overpressure
All PRTC MOAs Designated Low and High	Yes	No; does not permit needed maneuvers unless MOAs scheduled together	Yes	Yes	PR-1A, PR-3, PR-4 and Gap Low and High MOAs avoid some conflicts	Reduces some potential conflicts unless MOAs scheduled together	Partially: All MOAs designated Low and High does not meet training operational requirements; PR-1A, PR-3, PR-4, and Gap Low and High MOAs carried forward

Note: 1. No Restricted Area for a bombing range

2.3.3 Alternatives Considered But Not Carried Forward

Application of the alternative identification methodology resulted in the screening of potential alternatives and a focus on the Powder River airspace. Additional potential alternatives, including concepts raised during scoping, were evaluated but did not meet the fundamental purpose and need or were otherwise determined to not be reasonable alternatives. The following describes application of the screening criteria and why each of these concepts was not carried forward for detailed analysis in this EIS.

2.3.3.1 Establishment of an Inert or Live Bombing Range in Conjunction with a PRTC Proposal

The B-1 and B-52 combat missions include deployment of a wide variety of live munitions. Aircrews and ground personnel need training to be proficient for wartime engagements. Live munitions require substantial range areas to provide for Air Force and public safety. Inert munitions that do not carry an explosive charge, but may contain a shotgun shell-sized marking device, provide for some level of ordnance delivery training, but safety footprints are also large for inert munitions. Existing ranges can support a limited number of missions for training and munitions delivery. The sophistication of highly accurate, and therefore expensive, munitions is increasing the use of simulated weapons deployment

for mission training. Limited access to existing ranges for munitions delivery is possible, and the increased cost of sophisticated new weapons is increasing the use of electronic ranges. There are potential long-term environmental consequences of a bombing range, and the cost of obtaining and maintaining a new range make this alternative problematic. An inert or live bombing range in conjunction with the PRTC was an alternative considered but not carried forward in this EIS.

2.3.3.2 Increase Funding for Commuting

Increased funding for more commuting flight hours would not permit aircrews to train for all the complex missions required for modern warfighting. Long average sortie durations would use extensive aircrew and airframe time without contributing to training with sophisticated weapons and sensors. Additional funding cannot compensate for limited upgraded airframe availability. Longer duration flights would increase aircraft maintenance and associated costs. Maintenance activities are phased according to hours of use and type of airframe. Longer average sortie durations would require phased maintenance more frequently relative to the combat training time achieved during the sorties. Aircrew availability decreases with longer average sortie durations and sortie generation decreases. The alternative of increased funding to support more aircrew commute time with increased airframe use and increased maintenance was considered but not carried forward in this EIS.

2.3.3.3 Expanded Use of Simulators

Simulators have improved over the years and represent a valuable training aid. To the maximum extent possible, B-1 crews will continue to receive training on sophisticated simulators. Even the best simulators lack the realism of actual flying and aircrews do not receive the same physical training challenges in simulators as those which occur in actual flight. Simulators cannot replicate the problems and teamwork associated with real world flying with other aircraft. Aircrew combat mission readiness status requires many tasks, including maneuvers, low-altitude flight, and defensive tactics, to be performed in actual flight. Using simulators excludes other parts of the Air Force team essential in completing actual missions, such as maintenance, supply, and real time weather analysis. Expanded use of simulators does not produce the type of training needed to meet the purpose and need. Expanding the use of simulators in place of the proposed PRTC was an alternative considered but not carried forward for further analysis.

2.3.3.4 Relocate Aircraft

Scoping commenters asked whether it would be possible to relocate the bombers from Ellsworth and Minot AFBs to other bases nearer to assets that have capacity to meet all training needs. As explained in Chapter 1.0, training airspace limits the potential for quality training at other bases, and those bases with excellent airspace face capacity limits. Adding aircraft from Ellsworth AFB and/or Minot AFB to these bases would exceed the capacity of the local training airspace and exceed the existing base support infrastructure. This would result in reduced training capabilities for all aircraft using the airspace. On August 26, 2005, the nine-member BRAC commission voted 8-1 to retain Ellsworth AFB and, thereby, continue to base and train B-1 bombers. The summary of the Chairman was that there would be no savings from moving the B-1 from one very good base to another very good, essentially equal base (Defense Base Closure and Realignment Commission Final Deliberations, August 2005).

2.3.3.5 Supersonic Flight at Lower Altitude or During Regular Training in Conjunction with a PRTC Alternative

During scoping presentations, the Air Force considered supersonic flight for all aircraft, including B-1s, down to an altitude of 10,000 feet AGL during day-to-day and LFE training activity. Scoping comments expressed concern that this aspect of the PRTC proposal could impact activities under the airspace with

very high sonic boom overpressure. In addition, the public expressed concern that a sonic boom at any time could be disruptive to the region. As a result, the Air Force examined the effects of supersonic B-1 flight and those of transient fighter flights that could intermittently use the airspace.

The sonic boom overpressures presented in Figure 2-6 provide a general picture of overpressures resulting from B-1 supersonic flight and includes representative fighter aircraft which could train during a quarterly LFE. Actual overpressure would vary based on maneuvers (climb/descent, turns, acceleration/deceleration) and specific weather conditions (winds, vertical temperature/pressure profile). As the overpressures increase, the potential for damage and other impacts also grows. Section 2.4.5 presents the estimated supersonic flights in minutes per year during LFEs.

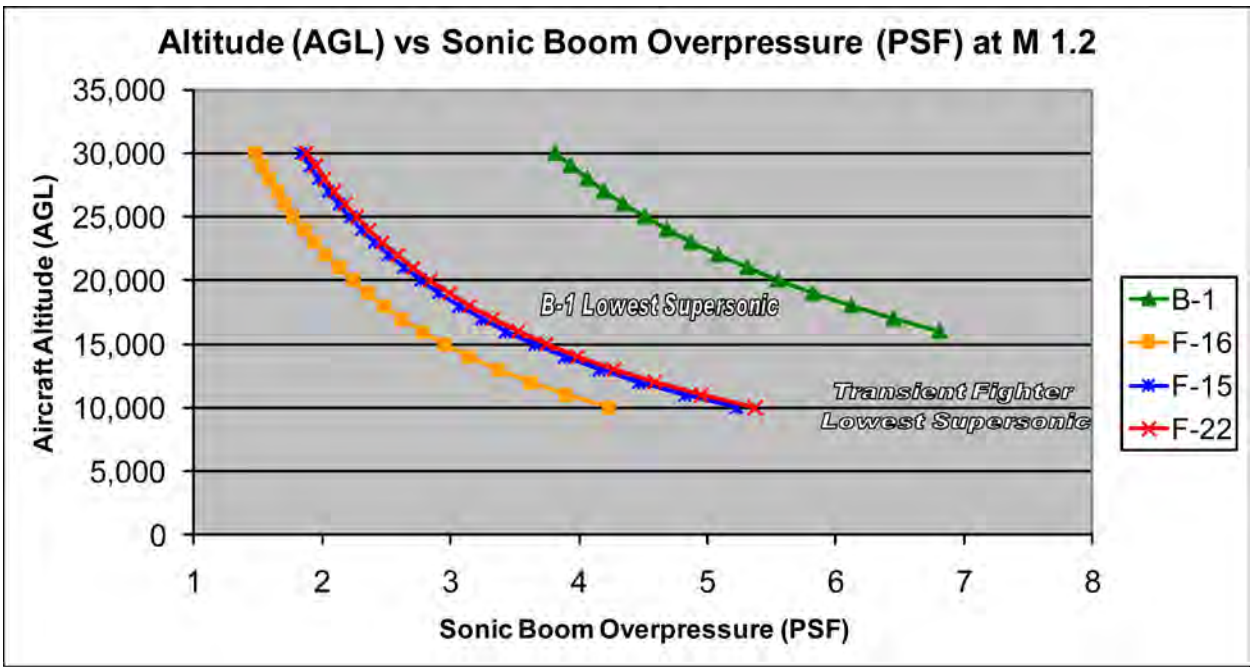


Figure 2-6. Altitude vs. Sonic Boom Overpressure

As a result of scoping comments and additional review, the PRTC proposal was changed to only schedule supersonic training during approximately 10 days of LFE training per year. During LFEs, the proposed minimum altitude for B-1 supersonic flight has been raised from the 10,000 feet AGL presented in scoping to 20,000 feet MSL. Fighters could conduct supersonic training down to 10,000 feet AGL only during LFEs. B-1 supersonic flight to an altitude of 10,000 feet AGL and supersonic training at any time was an alternative considered but not carried forward for further analysis in this EIS.

2.3.3.6 Powder River Airspace Expanded with Additional PR-1A/1B and Gap A MOAs and ATCAAs

This alternative would include the following elements (as illustrated and described in Figure 1-2): (1) expanding and modifying the existing Powder River A/B MOAs and the Crossbow and Powder River ATCAAs into the PR-2 MOA and associated ATCAAs; (2) establishing new PR-1A and PR-1B MOAs and associated ATCAAs to the west of the PR-2 MOA and ATCAAs; and (3) establishing the Gap A MOAs and ATCAAs. This would be an extension of existing airspace into an area that would provide topography for terrain following training. The expanded airspace would improve distances for existing B-1 weapon capabilities, but it would not be of sufficient size to permit realistic LFE training. There would be a reduced

impact to civil aviation compared to the proposed PRTC airspace (see Figure 1-2). Under this alternative, the additional training airspace would be concentrated in areas overlying populated portions of the Northern Cheyenne and Crow Reservations. The PR-1A/1B MOAs in combination with the PR-2 MOA would not provide airspace flexibility to adequately avoid seasonal noise-sensitive locations under the airspaces. The addition of the PR-1A, PR-1B, and Gap A MOAs and ATCAAs would not meet the purpose and need for three to four simultaneous training flights, would not provide for realistic distance or LFE training, and would not have adequate training airspace to mitigate impacts by avoidance.

2.3.3.7 Powder River Airspace Expanded with Additional PR-3 and Gap B MOAs and ATCAAs

This alternative would include the following elements (as illustrated and described in Figure 1-2): (1) expanding and modifying the existing Powder River A/B MOAs and the Crossbow and Powder River ATCAAs into the PR-2 MOA and ATCAAs; (2) establishing new PR-3 MOAs and ATCAAs to the north of the PR-2 MOA and ATCAAs; and (3) establishing the Gap B MOAs and ATCAAs. This alternative would not provide extensive topography for terrain following training. The addition of the PR-3 MOAs would provide some additional distances for existing B-1 weapon capabilities but would not be of sufficient size to permit realistic LFE training. The PR-3 MOAs/ATCAAs would have some benefit to B-52 access, although ATCAAs in this area are heavily used by commercial carriers. There would be a reduced impact to civil aviation compared to the proposed PRTC airspace (see Figure 1-2). Training would be concentrated in areas overlying ranching and agricultural activities, and the additional PR-3 MOAs would not provide flexibility to adequately avoid seasonal noise-sensitive locations within the airspace by scheduling other airspaces. The addition of the PR-3 and Gap B MOAs and ATCAAs would not meet the purpose and need for three to four simultaneous training flights, would not provide for realistic distance or LFE training, and would not provide adequate training airspace to mitigate impacts by avoidance.

2.3.3.8 Develop/Establish a New Airspace Complex

Establishment of a new airspace complex would require locating a suitable area with attributes as described in Section 2.3.2.2. Areas south and east of Ellsworth AFB would be unsuitable because of the amount of commercial air traffic (see Figure 2-5). Ground-based electronic combat training facilities are critical to this proposed action and the only existing facilities in the local area are within the Powder River airspace, Belle Fourche ESS. No other areas in the vicinity of Ellsworth AFB or Minot AFB present the combat training facilities necessary to establish a new airspace complex. Relocating the existing Belle Fourche ESS is not feasible or desirable. Extended ranges for threats and for addressing threats require training aircraft to address the threats from greater distances. Enemy forces have developed capabilities to threaten targets from greater distances and varied locations. Expanding airspace in conjunction with existing capabilities efficiently uses and builds upon existing infrastructure. Additionally, AFI 13-201 encourages the use of existing suitable airspace in lieu of establishing new airspace. Developing or establishing a separate new airspace complex was an alternative considered but not carried forward.

2.3.3.9 Utilization of Other Existing Airspace Complexes

In accordance with AFI 13-201, *Airspace Management*, paragraph 1.2.3.6, Headquarters Air Combat Command (ACC) has validated the justification for additional airspace capability to support Ellsworth AFB. All existing Special Use Airspace (SUA) in the vicinity of Ellsworth AFB and Minot AFB was reviewed and determined to be unsuitable for this proposed action prior to selecting the Powder River airspace as the best location. Existing military airspace presented in Figure 1-1 and Table 2-7 was reviewed to determine what existing airspace could be the focal point for expanded airspace to meet the purpose and need for bomber training with new technologies, sensors, and missions. The Lake Andes MOA, the

Tiger and Devils Lake MOAs, and the Hays MOA were considered but do not provide training capabilities for current bomber systems and generally do not have low-level training capabilities with the dimensions needed for high-speed bomber training. Therefore, these MOAs were not carried forward for further consideration.

2.4 OVERVIEW OF THE PROPOSED PRTC

The proposed PRTC action would provide airspace and ground assets to conduct local realistic training for Ellsworth and Minot AFBs. This EIS evaluates three alternatives which could fulfill the purpose and need defined in Chapter 1.0 and the No-Action Alternative which would not fulfill training requirements. Alternative A best meets the purpose and need by providing four combinations of MOA/ATCAA airspaces with improved training capability. Alternatives B and C do not provide the same level of low-altitude training capability with each providing three combinations of MOA/ATCAA airspaces rather than the four with Alternative A. Alternative C does not provide the training capability of Alternative A but is superior to Alternative B because Alternative C includes the Powder River 1A (PR-1A) and Power River 1B (PR-1B) MOAs. PR-1A and PR-1B are the only proposed airspaces containing 1,000 feet terrain elevation variations within 10 NM to meet B-1 terrain following training requirements (see Section 2.3.1.2).

The current Powder River airspace is essentially used up by one or two B-1 aircraft training together with new technologies, sensors, and weapon systems. The Proposed Action would modify and add to the existing Powder River airspace to establish the PRTC with improved training opportunities. The PRTC would permit four to eight B-1s to be efficiently launched and trained in local, high quality airspace. The Proposed Action would restructure and reconfigure the existing Powder River MOAs and associated ATCAAs, establish up to three additional MOA/ATCAA combinations, and include Gap MOAs and ATCAAs which could be used a maximum of once per quarter for 1 to 3 days, estimated for 10 days per year, to link up to four MOA/ATCAA airspaces to create a versatile, realistic training complex for LFEs. LFEs would permit approximately 20 aircraft of various types to train as the comprehensive team they must be in combat.

Proposed changes to the airspace would permit increased training flights dispersed throughout the MOAs and ATCAAs. PRTC would allow for almost a full range of required combat training missions, including LFEs with various aircraft types. The proposed PRTC would also support use of defensive countermeasure (chaff and flares) above 2,000 feet AGL and, during LFEs, supersonic flight above 20,000 feet MSL for B-1s and above 10,000 feet AGL for fighter aircraft. Fighter aircraft training up to, and including supersonic speeds, would train with the bombers during LFEs.

The Powder River airspace currently provides B-1s with 46 percent of required training sorties and B-52s with 31 percent of required training sorties. The Air Force estimates that the PRTC airspace as proposed would provide for approximately 85 percent of 33 training sortie requirements for these aircrews. The Proposed Action would increase training efficiency and expend finite flying hours on high quality training with new capabilities and missions rather than low-value commuting to remote locations. PRTC would not include any air-to-ground inert or live ordnance range. This means both the B-1s and B-52s would continue to fly to remote training locations such as NTTR, UTTR, and the MHRC to complete approximately 15 percent of their required training sorties.

Alternative A, the Air Force Proposed Action, provides the greatest amount of training airspace by restructuring the Powder River airspace and creating three new MOA/ATCAA combinations for bomber training and associated Gap MOA/ATCAAs for LFEs. Alternatives B and C, while different, each includes restructuring the Powder River airspace and creating two new MOA combinations and ATCAAs for bomber training and associated Gap MOA/ATCAAs for LFEs. Alternative A best meets the purpose and need described in Chapter 1.0. Alternative B meets many of the identified needs and provides approximately 76

percent of B-1 and B-52 training sortie requirements locally with some reduced quality B-1 training when compared with Alternative A. Alternative C provides approximately 76 percent B-1 and B-52 required training sorties locally with some higher quality training for B-1 aircrews than Alternative B because training topography is included under PR-1A and PR-1B. The No-Action Alternative retains the structure and use of the existing Powder River airspace. Bombers from Ellsworth AFB and Minot AFB would continue to search for new ways to obtain combat mission capability.

All three PRTC action alternatives would involve the same basic elements and all would build from the existing Powder River airspace. Differences among the alternatives would derive from the number and configuration of MOA and ATCAA combinations, as well as associated numbers of training sortie-operations and their altitude distributions. The Air Force considers the Proposed Action, Alternative A, to be the preferred alternative, in accordance with Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1502.14(e).

2.4.1 Elements Common to the Three Action Alternatives

The elements common to the three action alternatives are: airspace structure, flight operations, LFEs, supersonic flights during LFEs, defensive countermeasures, and ground-based training assets. Should a decision be made to proceed with one of the action alternatives, the Air Force estimates FAA establishment and charting of the airspace within three years of the Record of Decision (ROD) on this EIS.

2.4.2 Airspace Structure

Each of the three action alternatives includes proposed changes to existing airspace. The Air Force has proposed airspace modifications and has the responsibility under the National Environmental Policy Act (NEPA) for analyzing the potential environmental consequences of each alternative. The FAA is a cooperating agency in the NEPA analysis and is responsible for evaluating, processing, and charting airspace changes. FAA Order 7400.2G, excerpts of which are provided in Appendix A and is available in its entirety online at www.faa.gov, presents the FAA's procedures for processing airspace changes. Each action alternative includes four categories of changes to airspace structure.

- **Establishment:** This category of change refers to instances where the FAA would establish new MOA or ATCAA airspace. MOAs are established through FAA non-rule making action. ATCAAs are established through Letters of Agreement (LOA) with FAA. Each of the three action alternatives includes the proposed establishment of new airspace, such as MOAs and ATCAAs not overlapping with the existing Powder River A/B MOAs.
- **Modification:** This category applies to existing airspace that would be incorporated into and/or re-designated as part of a proposed MOA/ATCAA. The proposed PRTC is built around and incorporates most of the existing Powder River airspace.
- **Expansion**: This category applies to existing airspace units which would be increased in volume and incorporated into and/or re-designated as part of a proposed MOA/ATCAA. The existing Powder River A (PR-A) and PR-B MOAs would be somewhat expanded and renamed the PR-2 MOA.

Victor Airways are essentially highways in the sky from 1,200 feet AGL to FL180 in Class E airspace. Many powered aircraft follow these routes. The routes connect radio navigation beacons called "very high frequency omni-directional range" or VOR stations that radiate a signal in all directions. These stations are usually located at or near airfields. The width of these airways depends on the distance from the navigational aids. There are separation distances for aircraft flying within the Victor Airway (internal separation) and separation distances for aircraft outside the airway (external separation).

- **Elimination***:* This category applies to the portion of the Black Hills ATCAA not subsumed into the Gateway ATCAA. This portion would be eliminated and no longer comprise an ATCAA. The existing Powder River A MOA floor would be raised from surface to 500 feet AGL. Below 500 feet AGL would be eliminated as a part of the MOA.

All three action alternatives share several features. The proposed PRTC MOA and ATCAA boundaries would avoid most civil aviation Victor Airways by at least 5 NM internal and 4 NM external separation. The MOA/ATCAA boundaries would avoid major Victor Airway intersections by more than 20 NM. PRTC ATCAAs would include Low FL180 to FL260, Medium above FL260 to FL370, and High above FL370 to FL600 ATCAAs above all MOAs as well as the Gateway East and West ATCAAs. ATCAAs for LFEs would be scheduled by NOTAM and the estimated LFE use would be 4 hours per day, estimated to be 10 days per year, and approximately 1 to 3 days in any one quarter. These MOA/ATCAAs would be activated by the FAA to support LFEs and scheduled to avoid high use periods by civil aviation to the extent possible.

Figure 2-7 is the proposed PRTC airspace with communities, reservations, highways, and other points of interest. Each individual alternative, described in Sections 2.5 through 2.7, would be comprised of all or portions of the MOA/ATCAAs shown on Figure 2-7. Figure 2-8 is a three dimensional representation of the proposed PRTC showing the individual stacked MOAs and ATCAAs. The proposed PR-1A, PR-3, and PR-4, as well as the proposed Gap MOAs have Low, 500 feet AGL to, but not including, 12,000 feet MSL, and High, 12,000 feet MSL to, but not including, FL180. PR-1B and PR-2 MOAs are from 500 feet AGL to, but not including, FL180. Operations within the proposed PR-1A, PR-1B, PR-2, PR-3, and PR-4 MOA airspaces would be scheduled by Ellsworth AFB and coordinated with the FAA to reduce conflict and ensure safe use by military and civil aircraft.

Each action alternative supports aerial refueling. Aerial refueling involves the act of receiving fuel efficiently and safely while in flight. Almost every aircraft in the Air Force inventory is aerial refueling capable. To optimize fuel and flight time, aerial refueling takes place as close to combat as possible, given enemy air defense threats. For training, the Air Force performs refueling operations within designated aerial refueling areas (also known as “tracks” or “anchors”) or within FAA approved airspace. Designated aerial refueling tracks/anchors are described within Department of Defense (DoD) Area Planning documents, and have established coordinates and altitudes which the Air Force has coordinated with the FAA. During scoping meetings, maps were displayed showing notional locations where aerial refueling could be planned for quarterly LFEs. No specific aerial refueling tracks/anchors are proposed to be established as part of PRTC, and those notional locations are not included in this EIS. Refueling can occur anywhere such activity is approved by ATC. For the PRTC action alternatives, the Air Force proposes to perform refueling as needed and approved by the ATC.

The geographic area encompassed by this airspace proposal lies within the controlling region of three FAA ARTCCs as described in Section 3.1.3.2.2. The FAA is a cooperating agency in this EIS and data for this EIS are being provided by the Salt Lake City ARTCC, Denver ARTCC, and Minneapolis ARTCC.

2.4.3 Airspace Operations

Increased numbers, frequency, and variety of sortie-operations would occur under all of the action alternatives.

A sortie-operation comprises the use of one airspace unit, a MOA or ATCAA, by one aircraft. Each alternative would have a variation of operations depending upon the airspace units in that alternative. Specific details about flight operations are included in Sections 2.5 through 2.7. Normal day-to-day training operations involve operating in an individual MOA/ATCAA for approximately 2 hours, with approximately 15 to 20 minutes of training activity below 2,000 feet AGL for those missions that require low altitude training. Each action alternative would involve substantial use of the airspace for sortie-operations by B-1s and B-52s.

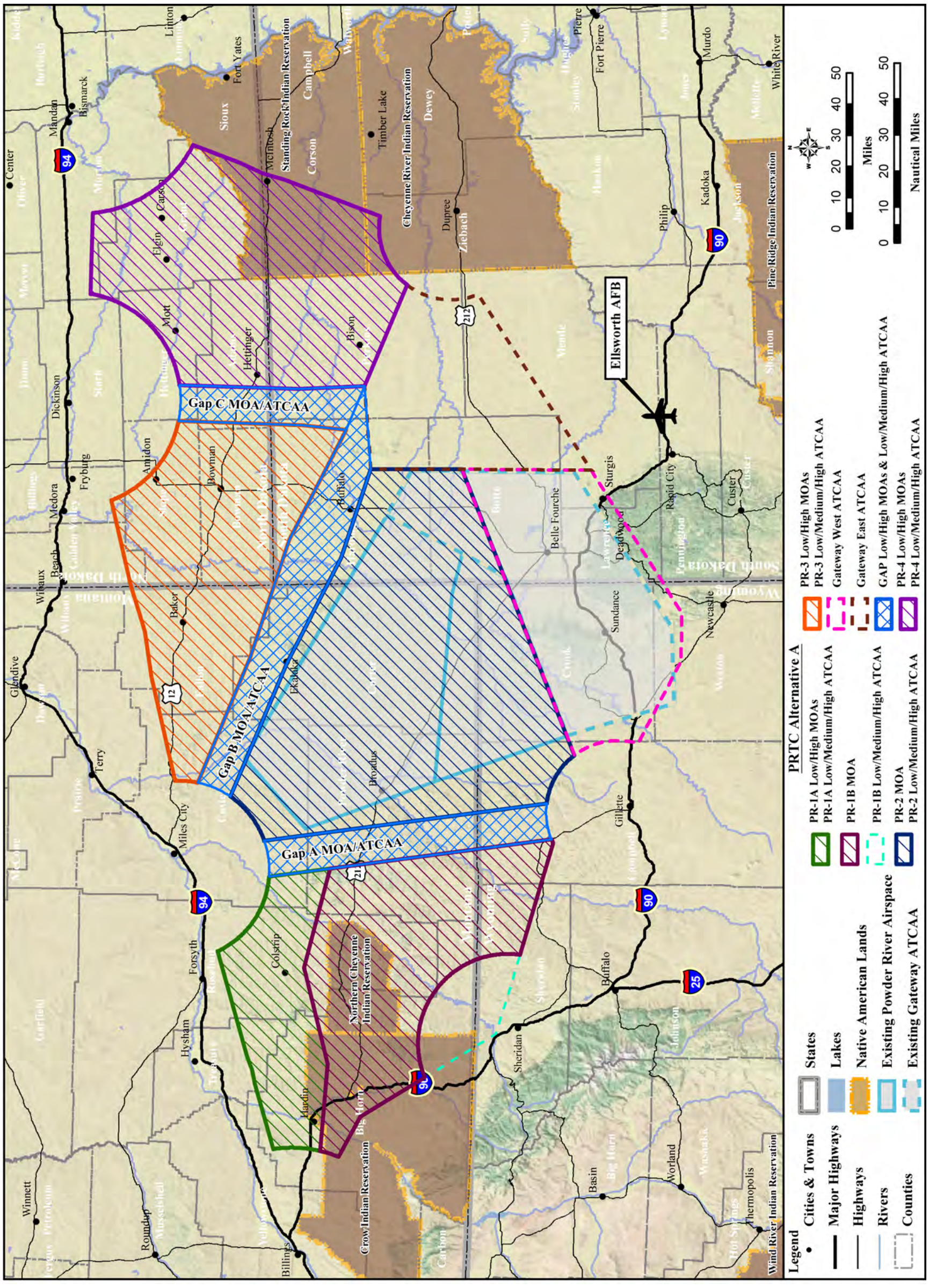


Figure 2-7. Extent of Proposed PRTC Airspace

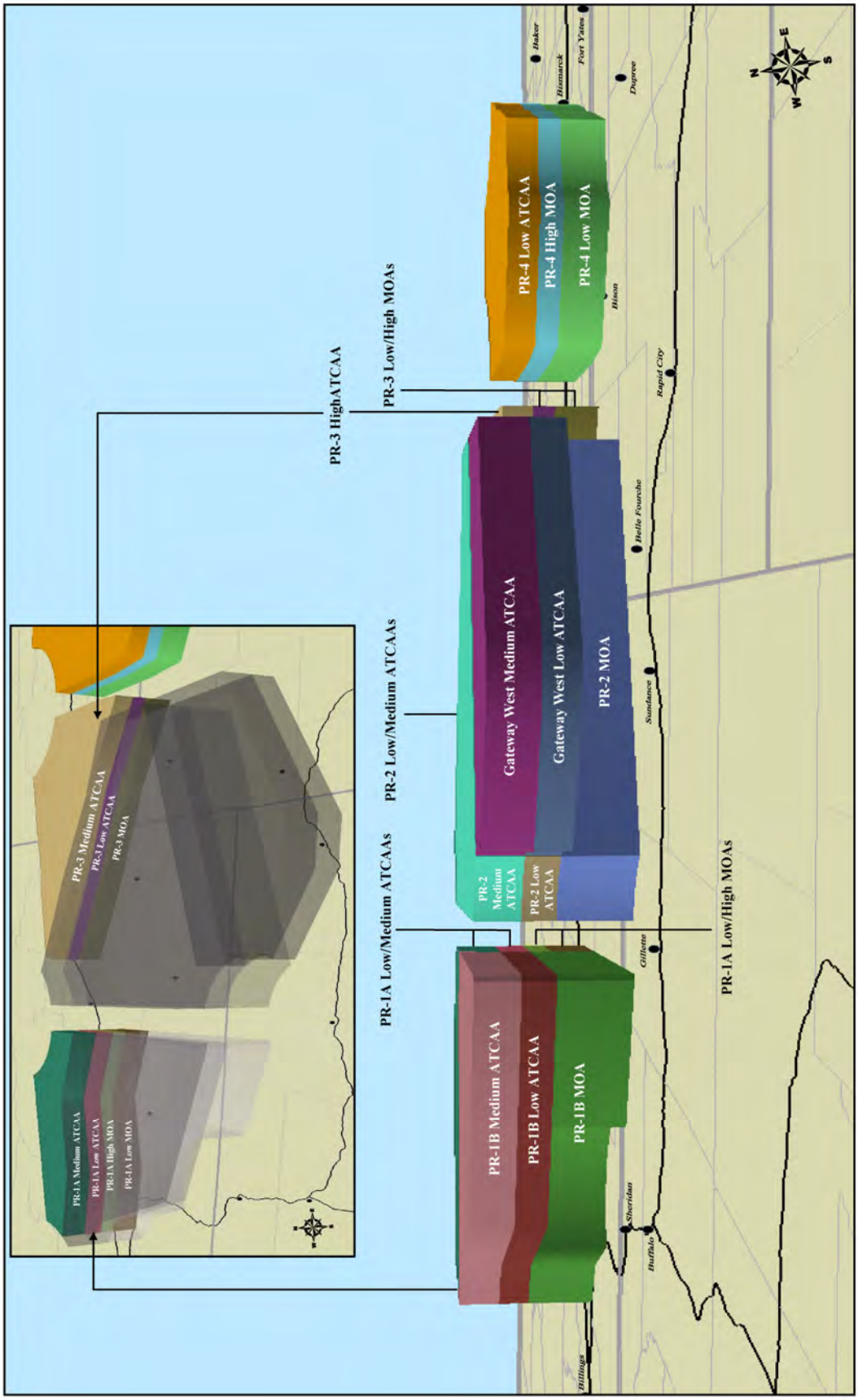


Figure 2-8. Proposed PRTC with MOAs and ATCAAs

2.4.4 Large Force Exercises

Realistic, stressful, and challenging operational training is the primary means to ensure readiness and prepare the Air Force to apply personnel and assets to meet national policies. Training consists of a careful progression of activities and threat complexity, including a balance of programs directed at individuals, crews, and larger organizational units through performance assessments. Whether an individual-level mission activity, a two-ship mission, or a larger LFE, realistic training is critical to maintaining military proficiency. LFEs are essential to modern combat training and provide B-1 and B-52 aircrews the opportunity to practice training as part of a combined force with different aircraft prior to combat.

An LFE is a highly sophisticated training exercise that simulates battlefield scenarios, and requires enough airspace to provide assembly, transition, ingress, egress, and maneuver areas. Such training exercises employ a full range of combat tactics, equipment, and personnel. Combat tactics are both offensive and defensive in nature and include flying at supersonic speed, use of defensive chaff and flares with restrictions, and simulated launching of weapons. At supersonic speeds, the timeframe during which aircrews are exposed to enemy threats is minimal and crew reaction times, which may have been seconds, become tenths of seconds.

Today a multi-force strike mission could involve almost any type of combat aircraft in the Air Force inventory. The weapons and sensors employed today by potential adversaries include a wide range of dispersed, camouflaged, and hardened radar- and visual-directed anti-aircraft artillery sites, as well as both ground- and air-launched radar-directed and heat-seeking missiles. For a mission to succeed, the Air Force must identify and defeat all these threats by simultaneously employing the entire range of available weapons, aircraft, and sensors. An LFE requires bomber aircrews to develop capabilities which cannot be learned in other training venues.

New and improved airspace would provide increased opportunities for transient fighters to conduct training, particularly during quarterly LFEs when the bombers could train with red air (opponents) and/or blue air (friendlies). Transient aircraft which could use the proposed PRTC include current fighters such as F-16s, F-15s, F-22s, or other military aircraft authorized to operate in U.S. airspace, such as C-130s (see Appendix B).

The Air Force proposes to conduct LFEs an estimated 10 days per year a maximum of once per calendar quarter, lasting typically from 1 to 3 days. LFEs would occur in a 4 hour time period per day and could include approximately 20 aircraft of various types training in simulated combat. LFEs would occupy all or substantial portions of the proposed PRTC.

The Air Force would employ the following measures during both regular training and LFEs to aid with civil aviation deconfliction.

1. All airspace scheduled times would continue to be published and are online at http://sua.faa.gov/sua/Welcome.do
2. Airspace scheduled outside of normal published times of use is disseminated via NOTAMs, available at https://pilotweb.nas.faa.gov/
3. Airspace use and long-term planning information on deconfliction, firefighting operations, and special/cultural events would continue to be available during business hours from the Ellsworth AFB Airspace Management Office at (605) 385-1230.

4. Information posted on flyers and posters will be provided to local airports annually through the Ellsworth AFB Flight Safety Office as part of the Mid-Air Collision Avoidance Program at (605) 385-4419.
5. The Ellsworth AFB Public Affairs Office is available to answer inquiries and complaints at (605) 385-5056.

2.4.5 Supersonic Activity

Fighter and B-1 aircraft participating in an LFE would employ supersonic speeds to simulate realistic engagements. The LFEs once per quarter with a maximum duration of 1-3 days are the only time supersonic maneuvers would be scheduled for training in the PRTC proposed airspace.

The Air Force would authorize supersonic flights within the PRTC airspace only during the estimated 10 days per year when LFEs are proposed to be conducted. Supersonic training is not authorized in existing Powder River airspace. The Air Force proposes supersonic flight training in all PRTC airspace units for air combat, air-to-air engagements, and other tactics. The most accurate training environment would have no restriction on speed, and the conduct of any mission would be dictated by mission needs and the aircraft capabilities. Airspace would be used in a variety of ways as every training mission has unique requirements. The B-1 bomber has supersonic capabilities and would be a source of sonic booms. The fighter presence in PRTC would normally be associated with LFEs, with an occasional transient fighter specific training mission. Keeping the design of the airspace simple is an important characteristic for airspace utility. Multiple altitude floors within an airspace detract from mission focus as aircrews strive to stay within the bounds. Ten thousand feet AGL is proposed as the supersonic floor for all fighters during LFEs only, and 20,000 feet MSL is proposed as the floor for B-1 supersonic flight only during LFEs.

Table 2-8 provides the aircraft types, number of sortie-operations, and total estimated time at or above supersonic speeds. While B-1s use supersonic speeds during missions, B-52s cannot fly at supersonic speeds. All B-1 supersonic activities would occur above 20,000 feet MSL. Transient fighter supersonic events would occur above 10,000 feet AGL. The B-1 duration of a supersonic event would average about 30 seconds. Transient fighter activity would vary by aircraft type and training. Approximately 70 percent of transient fighter supersonic flight activity would occur above 30,000 feet MSL. Supersonic activity would be randomly distributed within the MOA/ATCAAs proportionate to the patterning and distribution of sortie-operations by aircraft types.

Table 2–8. Estimated Supersonic Time Spent in Airspace (in minutes per year)

Aircraft	*Estimated Annual Supersonic Flights*	MOA (MINUTES/YEAR)	ATCAA (MINUTES/YEAR)	
		10,000 AGL to 17,999 MSL	*18,000 to 29,999 MSL*	*30,000 to 60,000 MSL*
B-1	60	15.0	15.0	0.0
F-16	60	1.4	9.0	18.4
F-15	20	.8	1.0	7.8
F-22	10	0	1.0	3.8
Other Fighters[1]	10	.2	1.0	3.6

Note: 1. Other fighters could include any fighter training in an LFE and are included as transients in airspace use tables in this EIS.

2.4.6 Defensive Countermeasures

Aircrews use chaff and flares as self-protection defensive countermeasures against radar-directed anti-aircraft artillery and radar-guided and heat-seeking missiles. When aircrews detect threats from these systems, they must respond instantly and instinctively deploy appropriate countermeasures. The PRTC action alternatives would permit defensive countermeasure training with chaff and flares. The Powder River airspace does not permit this needed training and aircrews are required to conduct chaff and flare training when they fly to remote range complexes.

The inability of aircrews to regularly train with defensive countermeasures results in the loss of critical response time in combat. The time aircrews take to counter threats can determine their survivability. Aircrews who train without actually deploying chaff and flares do not instinctively respond to a threat targeted at their aircraft. This pause to think becomes more critical with realistic single-ship or two-ship flight training where an aircrew is required to place the aircraft in a vulnerable position to accomplish the mission.

Within the PRTC airspace, chaff and flare training would be proportional to the number of sortie-operations conducted by each aircraft type in the specific airspace units. Each alternative presents this specific information. Figure 2-9 depicts the life cycle following release of chaff and flare countermeasures.

2.4.6.1 Chaff

Modern chaff (known as “angel hair” chaff) is thinner than a fine human hair and normally ranges in length from 0.3 to 1.0 inch. The chaff length determines the frequency range of the radio wave most effectively reflected by that particular fiber. Chaff fibers are cut to varying lengths to make chaff effective against the wide array of enemy radar systems that may be encountered during combat. A bundle of chaff weighs approximately 3.35 ounces and consists of approximately 5.0 to 5.6 million chaff fibers that, when dispensed from an aircraft, form an electronic “cloud” that confuses the radar by providing additional target(s) and temporarily hides the maneuvering aircraft from radar tracking.

During scoping meetings, participants were surprised to learn that dispersed individual chaff strands are almost invisible to the eye. Modern chaff is not like the aluminum strand chaff used from World War II through the Vietnam War. Chaff is made as small and light as possible so that it will disperse quickly and remain in the air long enough to confuse enemy radar. The chaff proposed for use in the PRTC airspace contains fibers configured to reduce interference with radars operated by the FAA throughout the National Airspace System. New FAA radars are sensitive enough to detect chaff so communication of when and where aircraft are training with chaff permits the FAA to identify and differentiate chaff from natural events.

Table 2-9 provides the estimated bundles of chaff and flares projected to be used annually by proposed PRTC airspace. Flare use is discussed in Section 2.4.6.2. The annual chaff and flare usage includes normal training and LFEs. An estimated 15 percent of the chaff and flares in Table 2-9 would be deployed by transients and 85 percent by B-1 or B-52 training aircraft.

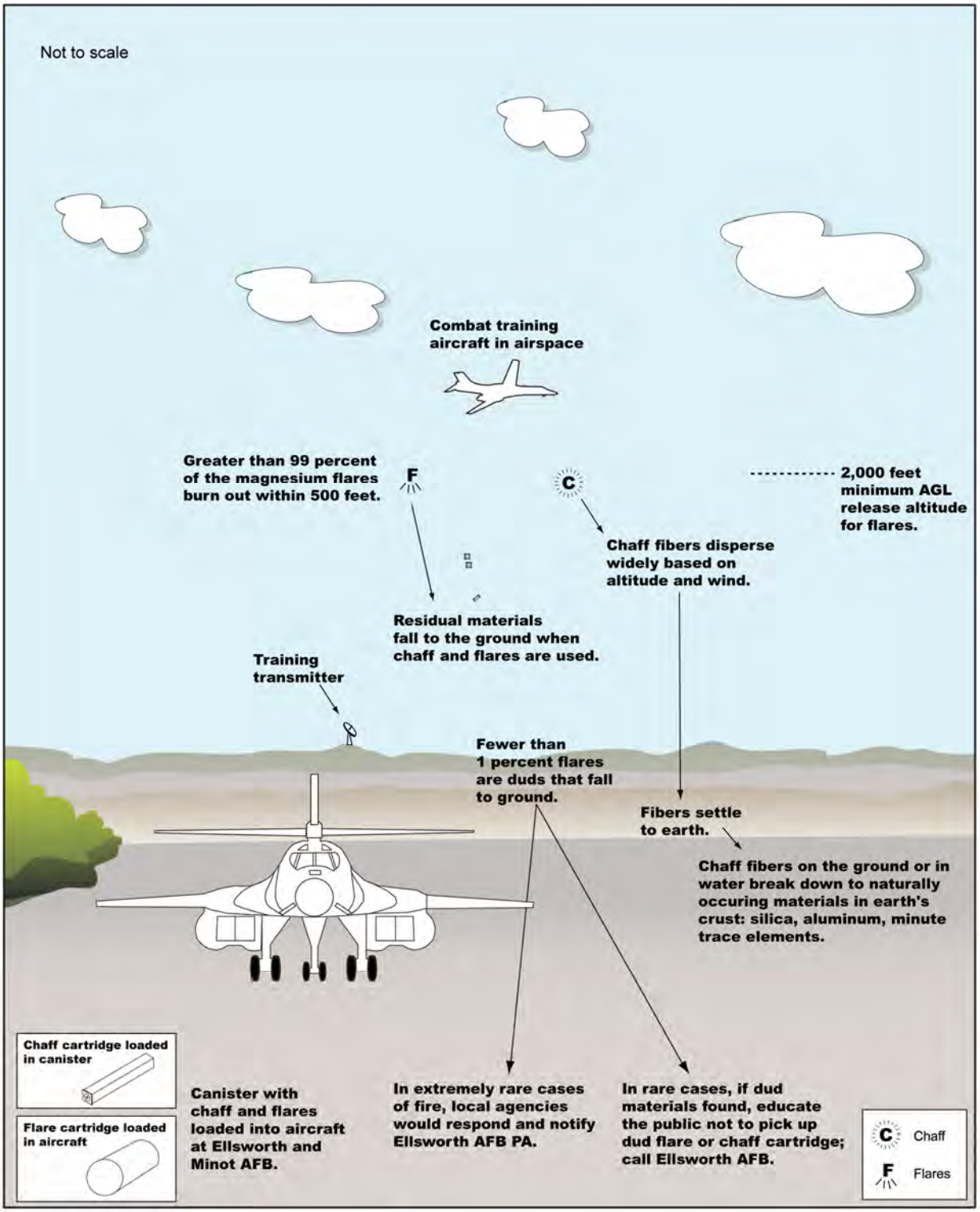


Figure 2-9. The Life Cycle of Dispensing Chaff and Flares

Table 2-9. Projected Annual Chaff and Flare Use by Airspace Unit

	ALTERNATIVE A		ALTERNATIVE B[1]		ALTERNATIVE C[2]	
Airspace Unit	***Chaff***	***Flares***	***Chaff***	***Flares***	***Chaff***	***Flares***
PR-1A/B MOAs/ATCAAs	8,300	820	4,000	400	6,000	600
PR-2 MOA/ATCAAs	11,000	1,100	11,500	1,150	11,500	1,500
PR-3 MOA/ATCAAs	4,200	420	4,600	460	4,600	450
PR-4 MOA/ATCAAs	5,500	550	5,850	600	4,000	400
Gap A MOAs/ATCAAs	200	20	130	10	200	20
Gap B MOAs/ATCAAs	260	30	300	30	300	30
Gap C MOAs/ATCAAs	140	10	150	20	90	10
Gateway East/West ATCAAs	3,400	350	3,500	350	3,500	350
Total	33,000	3,300	30,030	3,020	30,190	3,360

Notes: 1. PR-1A/1B MOA and Gap A MOA not part of Alternative B.
2. PR-4 MOA and Gap C MOA not part of Alternative C.

Dispersed chaff briefly reflects radar signals and forms an image on a radar screen. The aircrew must act together to detect a radar threat, deploy chaff, and maneuver the aircraft to escape the threat when the aircraft is masked by the chaff cloud. Chaff itself is not explosive; however, it is ejected from the aircraft pyrotechnically using a small explosive charge that is part of the ejection system. The chaff dispenser remains in the aircraft. Each individual chaff fiber has a silica core, is coated with aluminum, and then is coated with an animal fat material so that it does not clump together. As explained in Appendix C, silica and aluminum are the most common elements of the earth's crust. Two 1-inch square by 1/8-inch thick pieces of plastic and a felt spacer are ejected with the chaff. On rare occasions, deployed chaff may not wholly separate and may fall to earth as a clump of fibers (refer to Appendix C for more detailed information on chaff).

Under the action alternatives, chaff use would adhere to the following management practices:

- The chaff cloud can be detected by improved FAA radars, so to ensure that no chaff cloud interferes with ATC, chaff would not be deployed within 60 NM of airport approach radars.
- Chaff comparable to that described in this EIS, RR-188 chaff or equivalent, could be used for training. Any other chaff types would require separate environmental analysis.

2.4.6.2 Flares

Defensive flares are not explosive, they are magnesium pellets that, when ignited, burn for a short period (approximately 5 seconds) at approximately 1,202 degrees Fahrenheit (°F). B-1 flares are ejected upward and drop behind the aircraft. Other aircraft flares are ejected to the rear and downward. Flares burn out after falling approximately 500 feet (see Appendix D). The burn temperature is hotter than the exhaust of an aircraft engine and therefore attracts and decoys heat-seeking weapons and sensors targeted on the aircraft.

Table 2-9 includes estimated total defensive flare usage by B-1 and B-52 aircraft during normal training and all aircraft during LFEs**.** The magnesium flare used by B-1 aircraft is wrapped with aluminum-filament reinforced tape and inserted into an aluminum case which is closed with a felt spacer and a plastic end cap. The base of the case has a pyrotechnic impulse cartridge that is activated electrically to produce hot gasses that push one 3-inch diameter by 1/4-inch thick plastic cap and the flare material out of the flare dispenser mounted in the aircraft. The flare ignites as it is ejected from the dispenser. Each deployed flare results in the deposition on the ground of a 3-inch diameter end cap, a similarly sized plastic piston, up to four felt spacers, a plastic safe and initiation device approximately 1/2 inch by 1/2

inch by 2 inches, and a piece of aluminum coated wrapping material (similar to dried duct tape) that could measure up to approximately 5 inches by 20 inches, for a total of up to eight pieces of residual material per flare. Flares from transient aircraft, such as fighters, can produce up to six similar pieces of residual materials. On extremely rare occasions, a flare may not ignite and could fall to the earth as a dud flare (refer to Appendix D for more information about flares).

Use of flares within the PRTC would incorporate the following management practices:

- Flare release altitude for this proposal would not be below 2,000 feet AGL (flares burn out by the time they fall approximately 500 feet).
- Flare release would be discontinued in a MOA when fire danger is rated extreme under the National Fire Danger Rating System.
- The Air Force would continue to cooperate with local fire agencies for mutual aid response to wildland fires.
- The Air Force would work with local fire departments underlying the airspace to educate them on flare deployment and use. This education would include distributing flyers to fire departments describing flare residual materials and dud flares.

The extremely rare case of a dud flare falling to the ground could constitute a safety risk. Range clean-up activities at existing ranges in Utah and Arizona have resulted in an estimated on-the-ground dud rate of 0.01 percent of flares deployed. Based on Table 2-9, an estimated average of one dud flare per three years would fall to the surface somewhere under the proposed airspace. Although the risk of combustion of such a dud is low, it could be ignited by a hot fire or by friction from a strike with something like a power saw or a bullet. On a military range, a dud flare is treated as unexploded ordnance.

The Air Force would establish and maintain a procedure whereby chaff or flare materials found on public or private property can be identified for safety risk and removed to ensure safety. Air Force personnel will cooperate with local agencies for mutual aid response to fires, and develop an education program for fire departments beneath the airspace to include information on flares. The basic rule for the public to follow if encountering a dud flare is to identify its location, do not touch it or experiment with it, and notify a local safety authority of its location. The authority, in turn, will notify Ellsworth AFB which has the personnel and facilities to handle dud flares, should they be encountered. Any damage claim against the Air Force would start by contacting the Ellsworth AFB Public Affairs Office with as many details about the damage, time, and aircraft as possible.

2.4.6.3 Chaff and Flare Residual Materials

Each deployed bundle of chaff results in two 1-inch by 1-inch pieces of plastic and a felt spacer for bombers, for a total of four pieces of residual materials plus the deployed chaff. The F-22 chaff bundles have six 1/2-inch by 1-inch pieces (four plastic; two felt) and up to six pieces of 2-inch by 3-inch pieces of parchment paper, for a total of 12 pieces of residual materials per fighter chaff bundle. Each deployed flare results in a 3-inch diameter end cap, a similarly sized plastic piston, up to four felt spacers, a 1/2-inch by 1/2-inch by 2-inch plastic safe and initiation device and a piece of aluminum-coated wrapping material up to 5 inches by 20 inches in size, for a total of eight pieces of residual materials per bomber flare. Fighter flares result in five pieces of residual materials of similar shape to bomber flares.

Section 2.4.6.1 explains that each chaff bundle contains approximately 3.35 ounces of chaff. From Table 2-9, there would be an estimated 33,000 bundles of chaff released annually in defensive training. The total proposed PRTC area overflown (from Table 2-12) is approximately 35,200 square miles. The

volume of chaff particles per acre would be approximately (3.35 x 33,000)/(35,200 x 640) = 0.00491 ounces per acre, or approximately 0.139 grams of chaff per acre.

The 33,000 chaff bundles are estimated to produce approximately (0.85 x 33,000 x 4) + (0.15 x 33,000 x 12) = 171,600 pieces of chaff plastic, felt, or paper residual materials. Flares would result in approximately (0.85 x 3,300 x 8) + (0.15 x 3,300 x 5) = 24,915 pieces of flare plastic or wrapping materials. The total annual distribution of chaff and flare residual materials would be approximately (171,600 + 24,915)/(35,200 x 640) = 0.0087231 pieces per acre. This is an average of one piece per approximately 115 acres per year under the proposed PRTC. This is an average, as chaff and flare usage would vary by airspace unit (see Table 2-9).

Winds at the deployment altitude of chaff and flares and through which chaff and flare residual materials travel to the ground would affect the drift and ultimate deposition of residual materials. In actual practice, winds at one altitude could blow light chaff fibers out of the airspace and winds at another altitude could blow them back into the airspace. For purposes of this evaluation, all chaff and flare residual materials are assumed to fall to the ground under the training airspace.

2.4.7 Ground-Based Training Assets

A realistic training environment requires both an array of simulated threats, as well as a means to determine how well aircrews respond to and defeat those threats while simulating on-target ordnance delivery. These assets must also be linked to reflect the kinds of situations aircrews might encounter in actual combat. The existing electronic range complex consists of the Belle Fourche ESS and numerous emitter and/or simulated threat sites underlying existing MOA and ATCAA airspace. These sites provide training opportunities within the existing Powder River airspace and would continue to support training in the proposed PRTC.

Should a decision be made to pursue additional emitter and/or simulated target sites under PRTC, the Air Force would undertake NEPA analysis tiered to this EIS. The Air Force would also conduct the required real estate and National Historic Preservation Act (NHPA) process for all sites. Ellsworth AFB formerly performed a Minuteman Intercontinental Ballistic Missiles mission that included a number of 15-acre remote sites dispersed under the area of the proposed PRTC airspace. Such sites would be expected to receive initial consideration as possible threat emitter or simulated target locations. The construction of additional emitter and/or simulated target sites is considered a potential cumulative action and is discussed in Chapter 5.0.

2.5 Proposed Action: Alternative A

Alternative A, the Air Force Proposed Action, would expand and enhance the existing Powder River airspace to become PRTC. The enhanced airspace would provide realistic, integrated B-1 bomber training close to Ellsworth AFB to maximize training in local airspace and minimize long-distance commute time to remote training assets. The expanded training complex would support continued, and enhanced, B-52 training for aircraft from Minot AFB. Alternative A is based on B-1 and B-52 training needs, which in turn dictate the airspace structure and number and type of airspace operations that occur within the proposed PRTC airspace units. Transient aircraft and others who have used the Powder River airspace would continue to use this enhanced PRTC airspace. Alternative A would include the common elements described in Section 2.4.

2.5.1 Airspace Structure

Under Alternative A, the proposed PRTC would modify the existing Powder River airspace, add three additional MOAs and ATCAAs, and establish Gap MOAs/ATCAAs to link the airspace. Portions of the Black Hills ATCAA would be subsumed into the new structure and portions outside the proposed new structure would be eliminated. The proposed PRTC includes changes and expansion of the Powder River MOAs and ATCAAs as depicted on Figure 2-7.

Tables 2-10 and 2-11 present a description of airspace use associated with the alternatives. The tables include the proposed MOAs (Table 2-10) and ATCAAs (Table 2-11), their designated altitudes, time and daily hours of use, and expected days per year when the airspace would be scheduled.

Alternative A includes the greatest amount of new airspace (by volume) among the action alternatives. It would include four MOA combinations. Alternatives B or C each has three MOA combinations as described in Sections 2.6 and 2.7. Table 2-12 presents the estimated square miles under the airspace for the action alternatives. Table 2-31 in Section 2.8 presents the area in square miles under the existing Powder River airspace. The FL180 MOA area overflown is different for the three action alternatives although the above FL180 ATCAA area overflown would be the same for the three action alternatives.

The current Letter of Agreement between Ellsworth AFB and FAA has Powder River ATCAA defined as FL180 to FL260 inclusive and the Crossbow ATCAA as FL270 to FL450 inclusive. Although this appears to create a 1,000 foot break, the FAA manages the airspace to not produce a gap between the ATCAAs. For the purpose of this EIS, and to make clear that the airspaces are continuous, this EIS describes the airspace as Low ATCAA FL180 to, but not including FL260, Medium ATCAA above FL260 to, but not including FL370, and High ATCAA FL370 to FL600.

Table 2-10. MOA Description for Alternatives (Page 1 of 3)

MOA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
PR-1A Low	X		X		500 feet AGL up to, but not including, 12,000 feet MSL	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Salt Lake City ARTCC
PR-1A High	X		X		12,000 feet MSL up to, but not including, FL180	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Salt Lake City ARTCC
PR-1B	X		X		500 feet AGL up to, but not including, FL180	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Salt Lake City ARTCC
PR-2	X	X	X	X[1]	500 feet AGL up to, but not including, FL180	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	6 hours/day	240	Denver ARTCC
PR-3 Low	X	X	X		500 feet AGL up to, but not including, 12,000 feet MSL	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Salt Lake City ARTCC

Table 2-10. MOA Description for Alternatives (Page 2 of 3)

MOA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
PR-3 High	X	X	X		12,000 feet MSL up to, but not including, FL180	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Salt Lake City ARTCC
PR-4 Low	X	X			500 feet AGL up to, but not including, 12,000 feet MSL	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Minneapolis ARTCC
PR-4 High	X	X			12,000 feet MSL up to, but not including, FL180	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L Other times by NOTAM	3 hours/day	240	Minneapolis ARTCC
Gap A Low	X		X		500 feet AGL up to, but not including, 12,000 feet MSL	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Denver ARTCC
Gap A High	X		X		12,000 feet MSL up to, but not including, FL180	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Denver ARTCC

Table 2-10. MOA Description for Alternatives (Page 3 of 3)

MOA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
Gap B Low	X	X	X		500 feet AGL up to, but not including, 12,000 feet MSL	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Denver ARTCC
Gap B High	X	X	X		12,000 feet MSL up to, but not including, FL180	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Denver ARTCC
Gap C Low	X	X	X		500 feet AGL up to, but not including, 12,000 feet MSL	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Minneapolis ARTCC
Gap C High	X	X	X		12,000 feet MSL up to, but not including, FL180	By NOTAM (Large Force Exercise Only)	4 hours/day	10	Minneapolis ARTCC

Note: 1. The existing Powder River A/B MOAs extend over much of the same area considered for PR-2.
L = Local

Table 2-11. ATCAA Description for Alternatives (Page 1 of 3)

ATCAA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
PR-1A Low	X	X	X		FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-1A Medium	X	X	X		Above FL260 to FL370	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-1A High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
PR-1B Low	X	X	X		FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-1B Medium	X	X	X		Above FL260 to FL370	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-1B High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
PR-2 Low	X	X	X	X[1]	FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	10 hours/day	240	--
PR-2 Medium	X	X	X	X[1]	Above FL260 to FL370	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	10 hours/day	240	--
PR-2 High	X	X	X	X[1]	Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--

Table 2-11. ATCAA Description for Alternatives (Page 2 of 3)

ATCAA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
PR-3 Low	X	X	X		FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-3 Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--
PR-3 High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
PR-4 Low	X	X	X		FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
PR-4 Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--
PR-4 High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
Gateway West Low	X	X	X		FL180 to FL260	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
Gateway West Medium	X	X	X		Above FL260 to FL370	Monday-Thursday 0730-1200 L and 1800-2330 L Friday 0730-1200 L	4 hours/day	240	--
Gateway West High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
Gateway East Low	X	X	X		FL180 to FL260	Large Force Exercise Only	4 hours/day	10	--
Gateway East Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--

Table 2-11. ATCAA Description for Alternatives (Page 3 of 3)

ATCAA	*Alternative A*	*Alternative B*	*Alternative C*	*No Action*	*Designated Altitudes*	*Time of Use*	*Expected Daily Use*	*Estimated Days/Year*	*Controlling Agency*
Gateway East High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
Gap A Low	X	X	X		FL180 to FL260	Large Force Exercise Only	4 hours/day	10	--
Gap A Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--
Gap A High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
Gap B Low	X	X	X		FL180 to FL260	Large Force Exercise Only	4 hours/day	10	--
Gap B Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--
Gap B High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--
Gap C Low	X	X	X		FL180 to FL260	Large Force Exercise Only	4 hours/day	10	--
Gap C Medium	X	X	X		Above FL260 to FL370	Large Force Exercise Only	4 hours/day	10	--
Gap C High	X	X	X		Above FL370 to FL600	Large Force Exercise Only	4 hours/day	10	--

Note: 1. The Powder River ATCAA extends over much of the same area considered for PR-2.
L = Local

Table 2-12. Surface Overflown by Proposed PRTC Action Alternatives

Airspace Type	*Airspace Unit*	*Overflown Area in Square Miles*		
		Alternative A	*Alternative B*	*Alternative C*
MOA	PR-1A	2,011	0.00	2,011
	PR-1B	4,083	0.00	4,083
	Gap A	1,049	0.00	1,049
	PR-2[1]	8,231	8,231	8,231
	Gap B	1,693	1,693	1,693
	PR-3	4,542	4,542	4,542
	Gap C	670	670	0.00
	PR-4	5,511	5,511	0.00
TOTAL MOA		27,790	20,647	21,609
ATCAA	PR-1A	2,011	2,011	2,011
	PR-1B	4,830	4,830	4,830
	Gap A	1,049	1,049	1,049
	PR-2[1]	8,231	8,231	8,231
	Gap B	1,693	1,693	1,693
	PR-3	4,542	4,542	4,542
	Gap C	670	670	670
	PR-4	5,511	5,511	5,511
	Gateway East	2,841	2,841	2,841
	Gateway West	3,822	3,822	3,822
TOTAL ATCAA		35,200	35,200	35,200

Note: 1. Approximate Powder River airspace currently overflown

2.5.2 Airspace Operations

Under Alternative A, the primary users of the enhanced PRTC would be B-1s from Ellsworth AFB and B-52s from Minot AFB. Other users would be bombers and tankers from other bases and transient fighters, mostly from the surrounding area. The increased size and availability of local training airspace would allow an increase in the number of sorties available to meet aircrew training needs for both B-1 and B-52 aircraft. Alternative A would increase local training sorties from the current B-1 use of Powder River airspace from 46 percent of training sorties and B-52 use of Powder River airspace from 31 percent of training sorties to 85 percent local training sorties for each.

Training in remote areas such as UTTR, NTTR, and MHRC would account for the other 15 percent of training and would permit aircrews to continue to conduct actual ordnance delivery training in locations where inert or live bombs can be deployed. Table 2-13 presents the baseline number of sorties to local and remote training areas compared to proposed sorties with Alternative A. The table demonstrates the proportional increase in local training time. As indicated in Section 2.3.2, the PRTC would substantially reduce low-value transit or commute time and increase realistic combat training time.

Table 2-13. Annual Sortie Comparison Between Baseline and Alternative A

Sortie	Baseline				Alternative A				Change		*Total B-1 and B-52*
	B-1	*%*	*B-52*	*%*	*B-1*	*%*	*B-52*	*%*	*B-1*	*B-52*	
Local	1,000	46%	300	31%	2,160	85%	808	85%	+1,160	+508	+1,668
Remote	1,160	54%	650	69%	380	15%	142	15%	-780	-508	-1,288

Currently, B-1s operate within all airspace units associated with the existing Powder River airspace, while most B-52 Powder River airspace operations occur within the Crossbow ATCAA with occasional use of Powder River MOAs. Under Alternative A, B-52s would operate primarily within all ATCAA airspace with occasional sorties in the new MOAs. B-1 use would be spread throughout the PRTC airspace. B-1s and B-52s historically have trained for the low-level penetration mission on Instrument Routes (IRs) which traverse the area leading to the Belle Fourche electronic range. Three IRs, IR-473, IR-485, and IR-492, are intermittently used by training aircraft (see Section 3.1.3.2.3). Low-level navigation on IRs is expected to continue at its current level of intermittent activity. Secondary users, such as tankers, would conduct aerial refueling in ATCAAs as needed and scheduled with the FAA. Transient aircraft are projected to increase their training from baseline and that training is included in the PRTC airspace use.

Table 2-14 presents baseline and projected sortie-operations in MOA and ATCAA airspace. All B-1 and B-52 sortie-operations training in the MOAs would also train in the overlying ATCAAs during the same mission. Some training missions would occur only in the ATCAAs.

Table 2-14. Alternative A MOA and ATCAA Annual Sortie-Operations Comparison

	Aircraft				
	B-1	***B-52***	***Transient[1]***	***Tankers***	***Total***
Baseline					
MOA	500	0	60	0	560
ATCAA	1,250	1,500	90	0	2,840
Projected					
MOA	1,680	438	419	0	2,252
ATCAA	5,890	1,713	1,215	602	9,419
Increase					
MOA	1,180	438	359	0	1,692
ATCAA	4,640	213	1,125	602	6,579

Note: 1. Includes F-16, F-15, and F-22 fighter aircraft and others (see Appendix B).

Aircraft capabilities and missions are constantly changing to reflect real world combat experiences and expected missions. Table 2-15 presents estimated annual training activity for each airspace unit for each type of aircraft for day-to-day training. Table 2-16 presents the Alternative A LFE airspace training usage by airspace, altitude, and training aircraft type. Table 2-17 combines the day-to-day training and the LFE training to present a projected total airspace usage under Alternative A. Table 2-17 details the estimated Alternative A time and altitude distribution for all training aircraft. Times and altitude distributions are presented in estimated hours over an average year and represent a best estimate of training activity based upon the day-to-day and LFE training requirements presented in Chapter 1.0. As capabilities and threats change and aircrews receive new training missions, the distribution of annual hours would be expected to vary.

2.5.3 Large Force Exercises

Alternative A would support LFEs for mission training in simulated combat engagements as described in Section 2.4.4. For the purpose of this EIS, approximately 20 aircraft of various types are assumed for a maximum of once quarterly LFEs scheduled for 1 to 3 days for a total of approximately 10 days per year. Airspace would be activated an estimated 4 hours per LFE day. During an LFE, the corridors designated as Gap A, B, C MOAs/ATCAAs; Gateway East ATCAA; and Gateway West ATCAA could be activated in any number of configurations to accommodate the larger numbers of aircraft. The projected LFE time and altitude distributions are included in the aircraft by airspace distribution in Table 2-16.

Table 2-15. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative A (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	274.73	2.78	0.00
	B-52	350/19	225	0.00	41.40	7.25	1.04	2.07	1.74	171.50	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	8.25	2.75	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	0.61	1.49	0.00
PR-2 MOA/ATCAA	**B-1**	1410/290	681.25	34.06	76.64	34.06	17.03	8.52	505.83	5.11	0.00
	B-52	570/30	225	0.00	41.40	7.25	1.04	2.07	1.74	171.51	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	0.75	0.25	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	0.61	1.49	0.00
PR-3 MOA/ATCAA	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	277.50	0.00	0.00
	B-52	59/3	12.5	0.00	2.30	0.40	0.06	0.12	9.61	0.01	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	2.10	0.00	0.00
PR-4 MOA/ATCAA	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	274.73	2.78	0.00
	B-52	350/19	137.5	0.00	25.30	4.43	0.63	1.27	1.06	104.82	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	8.25	2.75	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	0.61	1.49	0.00
Gap A MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gap B MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2-15. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative A (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway East ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway West ATCAA	**B-1**	375/75	168.75	0.00	0.00	0.00	0.00	0.00	167.06	1.69	0.00
	B-52	285/15	75	0.00	0.00	0.00	0.00	0.00	0.75	74.25	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	1/1	1	0.00	0.00	0.00	0.00	0.00	0.29	0.71	0.00
Totals Alternative A	**B-1**	3627/743	1960	89.56	201.52	89.56	44.78	22.39	1499.84	12.34	0.00
	B-52	1614/86	675	0.00	110.40	19.32	2.77	5.53	14.90	522.09	0.00
	Tanker	20/6	24	0.00	0.00	0.00	0.00	0.00	18.25	5.76	0.00
	Transient	25/9	13	0.65	0.65	0.00	0.00	2.30	4.22	5.18	0.00

Table 2-16. Estimated Annual LFE Time and Altitude Distribution, Alternative A (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	200/200	88.85	4.44	10.00	4.44	2.22	1.11	53.31	13.33	0.00
	B-52	25/25	20.68	0.00	0.00	0.00	0.00	0.00	0.20	20.28	0.20
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	100/100	33.32	1.80	1.80	0.00	0.00	6.40	8.16	12.83	2.33
PR-2 MOA/ATCAA	**B-1**	200/200	98.4	4.92	11.07	4.92	2.46	1.23	59.04	14.76	0.00
	B-52	25/25	22.3	0.00	0.00	0.00	0.00	0.00	0.22	21.86	0.22
	Tanker	32/32	4.58	0.00	0.00	0.00	0.00	0.00	3.44	1.15	0.00
	Transient	100/100	36.9	1.99	1.99	0.00	0.00	7.08	9.04	14.21	2.58
PR-3 MOA/ATCAA	**B-1**	200/200	58.88	2.94	6.62	2.94	1.47	0.74	35.33	8.83	0.00
	B-52	25/25	13.34	0.00	0.00	0.00	0.00	0.00	0.14	13.06	0.14
	Tanker	32/32	2.74	0.00	0.00	0.00	0.00	0.00	2.06	0.69	0.00
	Transient	100/100	22.08	1.19	1.19	0.00	0.00	4.24	5.41	8.50	1.55
PR-4 MOA/ATCAA	**B-1**	200/200	75.24	3.76	8.46	3.76	1.88	0.94	45.14	11.29	0.00
	B-52	25/25	17.05	0.00	0.00	0.00	0.00	0.00	0.18	16.69	0.18
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	100/100	28.22	1.52	1.52	0.00	0.00	5.42	6.91	10.86	1.98
Gap A MOA/ATCAA	**B-1**	200/200	12.96	0.65	1.46	0.65	0.32	0.16	7.78	1.94	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	100/100	4.86	0.26	0.26	0.00	0.00	0.93	1.19	1.87	0.34
Gap B MOA/ATCAA	**B-1**	200/200	17.64	0.88	1.98	0.88	0.44	0.22	10.58	2.65	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	6.62	0.36	0.36	0.00	0.00	1.27	1.62	2.55	0.46

Table 2-16. Estimated Annual LFE Time and Altitude Distribution, Alternative A (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	200/200	9.1	0.46	1.02	0.46	0.23	0.11	5.46	1.37	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	100/100	3.4	0.18	0.18	0.00	0.00	0.65	0.83	1.31	0.24
Gateway East ATCAA	**B-1**	100/100	3.21	0.00	0.00	0.00	0.00	0.00	2.57	0.64	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.2	0.00	0.00	0.00	0.00	0.00	0.42	0.66	0.12
Gateway West ATCAA	**B-1**	100/100	35.71	0.00	0.00	0.00	0.00	0.00	28.57	7.14	0.00
	B-52	25/25	16.18	0.00	0.00	0.00	0.00	0.00	0.16	15.86	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	50/50	13.39	0.00	0.00	0.00	0.00	0.00	4.69	7.36	1.34
Totals Alternative A	**B-1**	1600/1600	399.99	18.05	40.62	18.05	9.03	4.51	247.78	61.94	0.00
	B-52	225/225	100.01	0.00	0.00	0.00	0.00	0.00	1.00	98.01	1.00
	Tanker	288/288	127.99	0.00	0.00	0.00	0.00	0.00	95.99	32.00	0.00
	Transient	800/800	149.99	7.31	7.31	0.00	0.00	26.00	38.28	60.15	10.94

Table 2-17. Estimated Annual Combined Use LFEs and Day-to-Day Time and Altitude Distribution, Alternative A (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	814/326	458.85	22.94	51.62	22.94	11.47	5.74	328.04	16.10	0.00
	B-52	375/44	245.68	0.00	41.40	7.25	1.04	2.07	1.94	191.78	0.20
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	51.45	17.15	0.00
	Transient	106/102	36.32	1.96	1.96	0.00	0.00	6.97	8.77	14.32	2.33
PR-2 MOA/ATCAA	**B-1**	1610/490	779.65	38.98	87.71	38.98	19.49	9.75	564.87	19.87	0.00
	B-52	595/55	247.3	0.00	41.40	7.25	1.04	2.07	1.96	193.37	0.22
	Tanker	33/33	5.58	0.00	0.00	0.00	0.00	0.00	4.19	1.40	0.00
	Transient	106/102	39.9	2.15	2.15	0.00	0.00	7.66	9.65	15.70	2.58
PR-3 MOA/ATCAA	**B-1**	814/326	428.88	21.44	48.25	21.44	10.72	5.36	312.83	8.83	0.00
	B-52	84/28	25.84	0.00	2.30	0.40	0.06	0.12	9.75	13.07	0.14
	Tanker	33/33	3.74	0.00	0.00	0.00	0.00	0.00	3.05	0.69	0.00
	Transient	106/102	25.08	1.35	1.35	0.00	0.00	4.82	7.51	8.50	1.55
PR-4 MOA/ATCAA	**B-1**	814/326	445.24	22.26	50.09	22.26	11.13	5.57	322.64	11.29	0.00
	B-52	375/44	92.05	0.00	13.80	2.42	0.35	0.69	57.91	16.70	0.18
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	54.20	14.40	0.00
	Transient	106/102	31.22	1.69	1.69	0.00	0.00	5.99	9.01	10.87	1.98
Gap A MOA/ATCAA	**B-1**	200/200	12.96	0.65	1.46	0.65	0.32	0.16	7.78	1.94	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	100/100	4.86	0.26	0.26	0.00	0.00	0.93	1.19	1.87	0.34
Gap B MOA/ATCAA	**B-1**	200/200	17.64	0.88	1.98	0.88	0.44	0.22	10.58	2.65	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	6.62	0.36	0.36	0.00	0.00	1.27	1.62	2.55	0.46

Table 2-17. Estimated Annual Combined Use LFEs and Day-to-Day Time and Altitude Distribution, Alternative A (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	200/200	9.1	0.46	1.02	0.46	0.23	0.11	5.46	1.37	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	100/100	3.4	0.18	0.18	0.00	0.00	0.65	0.83	1.31	0.24
Gateway East ATCAA	**B-1**	100/100	3.21	0.00	0.00	0.00	0.00	0.00	2.57	0.64	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.2	0.00	0.00	0.00	0.00	0.00	0.42	0.66	0.12
Gateway West ATCAA	**B-1**	475/175	204.46	0.00	0.00	0.00	0.00	0.00	195.63	8.83	0.00
	B-52	310/40	91.18	0.00	0.00	0.00	0.00	0.00	0.91	90.11	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	51/51	14.39	0.00	0.00	0.00	0.00	0.00	4.98	8.07	1.34
Totals Alternative A	**B-1**	5227/2343	2359.99	107.62	242.14	107.62	53.81	26.90	1750.39	71.52	0.00
	B-52	1839/311	712.51	0.00	98.90	17.32	2.49	4.95	72.57	515.29	1.00
	Tanker	308/294	151.99	0.00	0.00	0.00	0.00	0.00	116.99	35.00	0.00
	Transient	825/809	162.99	7.96	7.96	0.00	0.00	28.30	43.98	63.85	10.94

2.5.4 Supersonic Activity

The Air Force proposes to conduct training which would involve supersonic flights within the PRTC airspace during LFEs. Supersonic flights could occur during air combat, air-to-air engagements, defensive maneuvers, and other tactics during the LFE. Table 2-8 provides an estimate of aircraft types and estimated time above supersonic speeds. All B-1 supersonic activities would occur above 20,000 feet MSL; transient fighter supersonic activity would be above 10,000 feet AGL. The B-1 would fly supersonic for about 30 seconds during 60 sorties during the 10 days of LFEs per year. Transient fighters would engage in an estimated 48 minutes of supersonic flight during the estimated 10 days of LFEs annually with an estimated 5 percent between 10,000 feet AGL and FL180, 25 percent from FL180 to FL300, and 70 percent above FL300. Supersonic activity would generally be toward the center of the LFE airspace over the proposed PR-2, PR-3, and Gap B MOAs/ATCAAs as aircraft use supersonic capabilities in engagements.

2.5.5 Defensive Countermeasures

Under Alternative A, an annual estimate of approximately 33,000 chaff bundles and 3,300 flares would be deployed. Table 2-18 presents the annual chaff and flare use for Alternative A from Table 2-9. Different aircraft types employ specific types of chaff and flares in quantities reflective of their missions. Chaff and flare use would adhere to the restrictions described in Section 2.4.6. Table 2-18 estimates the Alternative A annual numbers of chaff bundles and flares by airspace based upon time spent in the airspace. Chaff and flare residual materials would be as described in Section 2.4.6.3.

Table 2-18. Alternative A Estimated Chaff and Flare Use by Airspace

Airspace	*Chaff*	*Flares*
PR-1A/B MOAs/ATCAAs	8,300	820
PR-2 MOA/ATCAA	11,000	1,100
PR-3 MOA/ATCAA	4,200	420
PR-4 MOA/ATCAA	5,500	550
Gap A MOA/ATCAA	200	20
Gap B MOA/ATCAA	260	30
Gap C MOA/ATCAA	140	10
Gateway East/West ATCAA	3,400	350
Totals	33,000	3,300

2.5.6 Ground-Based Training Assets

The existing electronic range complex consists of the Belle Fourche ESS and numerous emitter and/or simulated threat sites underlying existing MOA and ATCAA airspace. These sites provide training opportunities within the existing Powder River airspace and would continue to support training in the proposed PR-2 MOA/ATCAA.

2.6 Alternative B

Alternative B expands and enhances the airspace and ground assets based on the existing Powder River airspace. Alternative B would include all the common elements described in Section 2.4.

2.6.1 Airspace Structure

Under Alternative B, the Air Force would request the FAA to establish the MOAs, ATCAAs, and Gap MOA ATCAAs defined for Alternative A with the exception of PR-1A MOAs, PR-1B MOA, and the Gap A MOAs (see Figure 2-10). Alternative B ATCAAs would be above the MOAs in PR-2, PR-3, PR-4, Gap B, and Gap C as they are for Alternative A. The PR-1A and PR-1B ATCAAs and Gap A ATCAA are included in Alternative B.

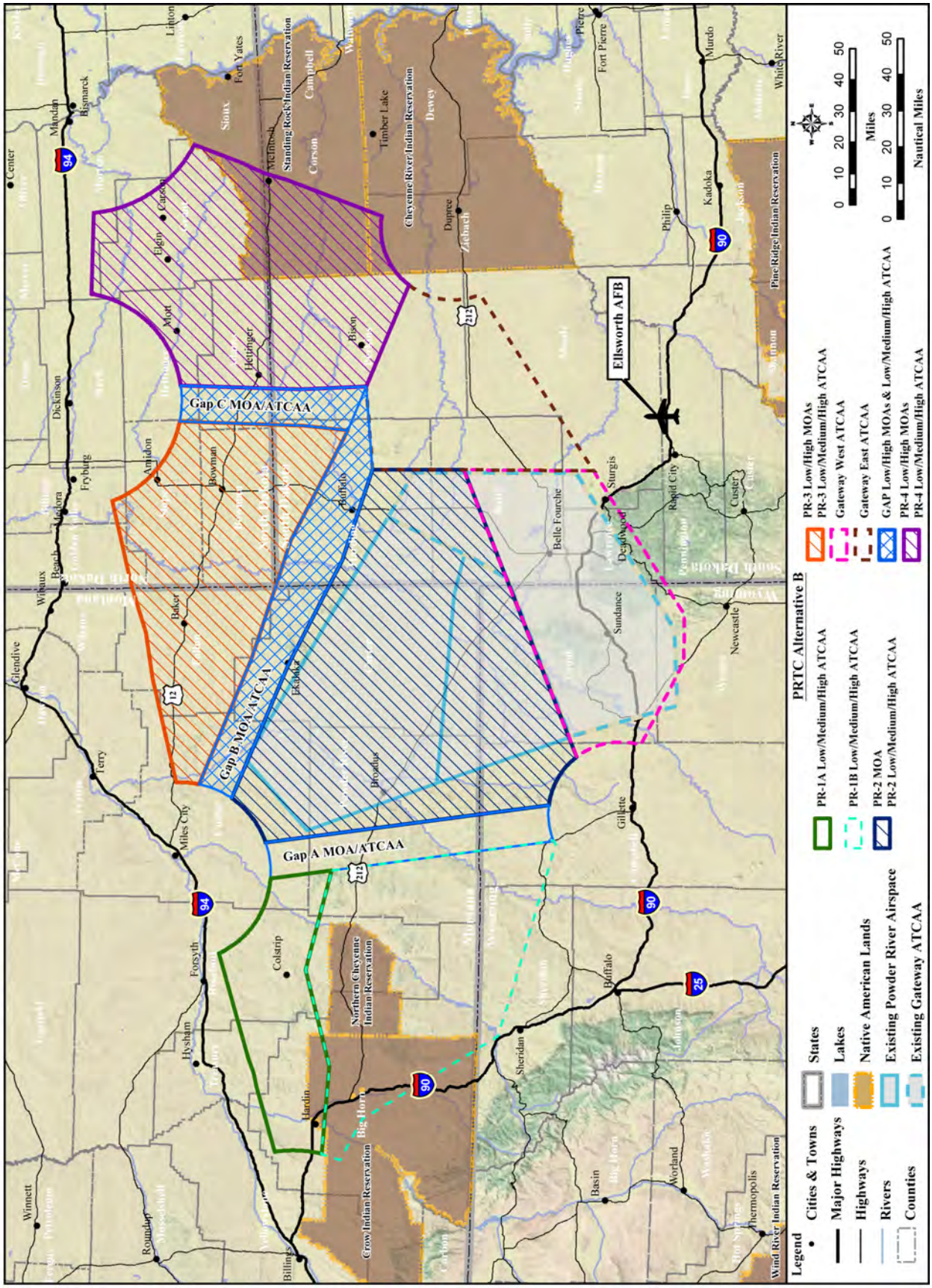


Figure 2-10. Alternative B Airspace

2.6.2 Airspace Operations

Under Alternative B, the primary users of the airspace would be the B-1s and B-52s. Table 2-19 compares local and remote sorties under baseline or existing conditions and Alternative B. This table demonstrates that Alternative B would increase local airspace training for B-1s from 46 percent of training sorties to 76 percent of training sorties and for B-52s from 31 percent to 76 percent of training sorties.

Table 2-19. Annual Sortie Comparison Between Baseline and Alternative B

	Existing				Alternative B				Change		Total B-1 and
Sortie	B-1	%	B-52	%	B-1	%	B-52	%	B-1	B-52	B-52
Local	1,000	46%	300	31%	1,940	76%	722	76%	+940	+422	+1,362
Remote	1,160	54%	650	69%	600	24%	228	24%	-560	-422	-982

With Alternative B, aircrews would use remote training complexes at a higher rate than with the Alternative A. As noted in Section 2.3.1.2, one criterion for quality training airspace is 1,000 feet of topography variation over a distance of 10 miles to conduct terrain following training. PR-1B MOA is the only proposed airspace with the ability to train with mountainous terrain needed for bomber terrain following tactics. Alternative B would not include this terrain.

Under Alternative B, approximately 76 percent of training sorties for the bombers would occur locally in the modified and new airspace. While this would constitute a substantial improvement over baseline conditions, it would be 9 percentage points lower than the 85 percent of local training sorties projected with Alternative A.

Table 2-20 presents Alternative B estimated and baseline sortie-operations in MOA and ATCAA airspaces for all aircraft during normal day-to-day and LFE training.

Table 2-20. Alternative B MOA and ATCAA Annual Sortie-Operations Comparison

	Aircraft				
	B-1	B-52	Transient[1]	Tankers	Total
Baseline					
MOA	500	0	60	0	560
ATCAA	1,250	1,500	90	0	2,840
Projected					
MOA	1,295	320	307	0	1,922
ATCAA	5,135	1,692	1,123	601	8,551
Increase					
MOA	795	320	247	0	1,362
ATCAA	3,885	192	1,033	601	5,711

Note: 1. Includes F-16, F-15, and F-22 fighter aircraft and others (see Appendix B).

The Alternative B day-to-day annual military training hours by aircraft in each airspace is presented in Table 2-21. The table reflects Alternative B with no PR-1A/B MOAs. Table 2-22 presents the LFE training hours for each altitude and airspace, including the LFE only airspaces. Table 2-23 adds the day-to-day and LFE training hours to present the total estimated hourly training hours by aircraft and Alternative B airspace. Table 2-23 is an estimated annual usage, including transients and tankers. Transient fighters would be expected to perform most of their sortie-operations during LFEs and tanker aircraft would support training as needed. Table 2-23 represents the total projected PRTC airspace use for Alternative B. As future missions change, hour distributions could also vary.

Table 2-21. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative B (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B ATCAAs	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	219/12	190.5	0.00	0.00	0.00	0.00	0.00	1.91	188.59	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	8.25	2.75	0.00
	Transient	3/1	3	0.00	0.00	0.00	0.00	0.00	0.87	2.13	0.00
PR-2 MOA/ATCAA	**B-1**	1410/290	681.25	34.06	76.64	34.06	17.03	8.52	505.83	5.11	0.00
	B-52	570/30	225	0.00	41.40	7.25	1.04	2.07	1.73	171.52	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	0.75	0.25	0.00
	Transient	6/2	2	0.11	0.11	0.00	0.00	0.38	0.41	0.99	0.00
PR-3 MOA/ATCAA	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	277.50	0.00	0.00
	B-52	59/3	12.5	0.00	2.30	0.40	0.06	0.12	9.61	0.01	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	2.10	0.00	0.00
PR-4 MOA/ATCAA	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	277.50	0.00	0.00
	B-52	350/19	75	0.00	13.80	2.42	0.35	0.69	57.73	0.01	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	8.25	2.75	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	0.61	1.49	0.00
Gap A ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gap B MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2-21. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative B (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway East ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway West ATCAA	**B-1**	375/75	168.75	0.00	0.00	0.00	0.00	0.00	167.06	1.69	0.00
	B-52	285/15	75	0.00	0.00	0.00	0.00	0.00	0.75	74.25	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	1/1	1	0.00	0.00	0.00	0.00	0.00	0.29	0.71	0.00
Totals Alternative B	**B-1**	3013/617	1590	71.06	159.89	71.06	35.53	17.77	1227.88	6.80	0.00
	B-52	1483/79	578	0.00	57.50	10.07	1.45	2.88	71.73	434.38	0.00
	Tanker	20/6	24	0.00	0.00	0.00	0.00	0.00	18.25	5.76	0.00
	Transient	22/8	12	0.43	0.43	0.00	0.00	1.54	4.28	5.32	0.00

Table 2-22. Estimated Annual LFE Time and Altitude Distribution, Alternative B (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B ATCAAs	**B-1**	100/100	52.1	0.00	0.00	0.00	0.00	0.00	41.68	10.42	0.00
	B-52	25/25	20.68	0.00	0.00	0.00	0.00	0.00	0.20	20.28	0.20
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	50/50	19.54	0.00	0.00	0.00	0.00	0.00	6.84	10.75	1.95
PR-2 MOA/ATCAA	**B-1**	200/200	112.38	5.62	12.64	5.62	2.81	1.40	67.43	16.86	0.00
	B-52	25/25	22.3	0.00	0.00	0.00	0.00	0.00	0.22	21.86	0.22
	Tanker	32/32	4.58	0.00	0.00	0.00	0.00	0.00	3.44	1.15	0.00
	Transient	100/100	42.14	2.28	2.28	0.00	0.00	8.09	10.32	16.22	2.95
PR-3 MOA/ATCAA	**B-1**	200/200	67.24	3.36	7.56	3.36	1.68	0.84	40.34	10.09	0.00
	B-52	25/25	13.34	0.00	0.00	0.00	0.00	0.00	0.14	13.06	0.14
	Tanker	32/32	2.74	0.00	0.00	0.00	0.00	0.00	2.06	0.69	0.00
	Transient	100/100	25.22	1.36	1.36	0.00	0.00	4.84	6.18	9.71	1.77
PR-4 MOA/ATCAA	**B-1**	200/200	85.92	4.30	9.67	4.30	2.15	1.07	51.55	12.89	0.00
	B-52	25/25	17.05	0.00	0.00	0.00	0.00	0.00	0.18	16.69	0.18
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	100/100	32.22	1.74	1.74	0.00	0.00	6.19	7.89	12.40	2.26
Gap A ATCAA	**B-1**	100/100	7.4	0.00	0.00	0.00	0.00	0.00	5.92	1.48	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	50/50	2.78	0.00	0.00	0.00	0.00	0.00	0.97	1.53	0.28
Gap B MOA/ATCAA	**B-1**	200/200	20.14	1.01	2.27	1.01	0.50	0.25	12.08	3.02	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	7.56	0.41	0.41	0.00	0.00	1.45	1.85	2.91	0.53

Table 2-22. Estimated Annual LFE Time and Altitude Distribution, Alternative B (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	200/200	10.38	0.52	1.17	0.52	0.26	0.13	6.23	1.56	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	100/100	3.9	0.21	0.21	0.00	0.00	0.75	0.96	1.50	0.27
Gateway East ATCAA	**B-1**	100/100	3.67	0.00	0.00	0.00	0.00	0.00	2.94	0.73	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.38	0.00	0.00	0.00	0.00	0.00	0.48	0.76	0.14
Gateway West ATCAA	**B-1**	100/100	40.77	0.00	0.00	0.00	0.00	0.00	32.62	8.15	0.00
	B-52	25/25	16.18	0.00	0.00	0.00	0.00	0.00	0.16	15.86	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	50/50	15.29	0.00	0.00	0.00	0.00	0.00	5.35	8.41	1.53
Totals Alternative B	**B-1**	1400/1400	359.23	14.80	33.31	14.80	7.40	3.70	228.17	57.04	0.00
	B-52	225/225	83.83	0.00	0.00	0.00	0.00	0.00	0.84	82.15	0.84
	Tanker	288/288	124.66	0.00	0.00	0.00	0.00	0.00	93.50	31.17	0.00
	Transient	700/700	134.74	6.00	6.00	0.00	0.00	21.32	35.50	55.79	10.14

Table 2-23. Estimated Annual Combined Use LFE and Day-to-Day Time and Altitude Distribution, Alternative B (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B ATCAAs	**B-1**	100/100	52.1	0.00	0.00	0.00	0.00	0.00	41.68	10.42	0.00
	B-52	244/37	211.18	0.00	0.00	0.00	0.00	0.00	2.11	208.87	0.20
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	51.45	17.15	0.00
	Transient	53/51	22.54	0.00	0.00	0.00	0.00	0.00	7.71	12.88	1.95
PR-2 MOA/ATCAA	**B-1**	1610/490	793.63	39.68	89.28	39.68	19.84	9.92	573.26	21.97	0.00
	B-52	595/55	247.3	0.00	41.40	7.25	1.04	2.07	1.95	193.38	0.22
	Tanker	33/33	5.58	0.00	0.00	0.00	0.00	0.00	4.19	1.40	0.00
	Transient	106/102	44.14	2.38	2.38	0.00	0.00	8.47	10.73	17.22	2.95
PR-3 MOA/ATCAA	**B-1**	814/326	437.24	21.86	49.19	21.86	10.93	5.47	317.84	10.09	0.00
	B-52	84/28	25.84	0.00	2.30	0.40	0.06	0.12	9.75	13.07	0.14
	Tanker	33/33	3.74	0.00	0.00	0.00	0.00	0.00	3.05	0.69	0.00
	Transient	106/102	28.22	1.52	1.52	0.00	0.00	5.42	8.28	9.70	1.77
PR-4 MOA/ATCAA	**B-1**	814/326	455.92	22.80	51.29	22.80	11.40	5.70	329.05	12.89	0.00
	B-52	375/44	92.05	0.00	13.80	2.42	0.35	0.69	57.91	16.70	0.18
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	51.45	17.15	0.00
	Transient	106/102	35.22	1.90	1.90	0.00	0.00	6.76	8.50	13.90	2.26
Gap A ATCAA	**B-1**	100/100	7.4	0.00	0.00	0.00	0.00	0.00	5.92	1.48	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	50/50	2.78	0.00	0.00	0.00	0.00	0.00	0.97	1.53	0.28
Gap B MOA/ATCAA	**B-1**	200/200	20.14	1.01	2.27	1.01	0.50	0.25	12.08	3.02	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	7.56	0.41	0.41	0.00	0.00	1.45	1.85	2.91	0.53

Table 2-23. Estimated Annual Combined Use LFE and Day-to-Day Time and Altitude Distribution, Alternative B (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C MOA/ATCAA	**B-1**	200/200	10.38	0.52	1.17	0.52	0.26	0.13	6.23	1.56	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	100/100	3.9	0.21	0.21	0.00	0.00	0.75	0.96	1.50	0.27
Gateway East ATCAA	**B-1**	100/100	3.67	0.00	0.00	0.00	0.00	0.00	2.94	0.73	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.38	0.00	0.00	0.00	0.00	0.00	0.48	0.76	0.14
Gateway West ATCAA	**B-1**	475/175	209.52	0.00	0.00	0.00	0.00	0.00	199.68	9.84	0.00
	B-52	310/40	91.18	0.00	0.00	0.00	0.00	0.00	0.91	90.11	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	51/51	16.29	0.00	0.00	0.00	0.00	0.00	5.64	9.12	1.53
Totals Alternative B	**B-1**	4413/2017	1990	85.87	193.20	85.87	42.93	21.47	1488.67	72.00	0.00
	B-52	1708/304	678.01	0.00	57.50	10.07	1.45	2.88	72.73	532.39	1.00
	Tanker	308/294	151.99	0.00	0.00	0.00	0.00	0.00	114.24	37.75	0.00
	Transient	722/708	162.03	6.43	6.43	0.00	0.00	22.86	45.13	69.51	11.68

2.6.3 Large Force Exercises

LFEs would form part of Alternative B, occurring with the same frequency and involving similar operations as described under the Alternative A. The patterns of use for LFEs and the distribution of sortie-operations would be similar to required training described for Alternative A with stand-off distance and altitude restrictions to account for the lack of the PR-1A, PR-1B, and Gap A MOAs. Sortie-operations for LFEs would be somewhat less than those described for Alternative A. Table 2-28 presents estimated LFE airspace usage. LFE would have reduced training effectiveness with Alternative B due to not having low-level mountainous terrain under the PR-1B ATCAA or extended stand-off distances at lower altitudes under the PR-1A, PR-1B, or Gap A MOAs.

2.6.4 Supersonic Activity

Alternative B supersonic activity would not be expected to discernibly change from Alternative A because LFE training would be the same as expected for Alternative A. B-1 supersonic flight would occur above 20,000 feet MSL within the airspace during LFEs as described for Alternative A. Alternative B would include authorization for transient fighter aircraft to fly supersonic above 10,000 feet AGL during LFEs. Total supersonic activity would be comparable to that described for Alternative A in Section 2.4.5. B-1 annual supersonic events would be estimated at 60 spread throughout the 10 days per year of LFEs. Table 2-8 lists the estimated supersonic minutes by aircraft type and altitudes. All B-1 and most fighter supersonic flight would occur in the ATCAAs.

2.6.5 Defensive Countermeasures

Under Alternative B, use of chaff and flares would follow the same patterns, procedures, and restrictions as described for Alternative A. The reduction in total sortie-operations between Alternative A and Alternative B would not be expected to result in a reduction in chaff and flare use because training with defensive chaff and flares would be required of aircrews. Table 2-24 presents the annual chaff and flare use under Alternative B from Table 2-9. Chaff and flare use would adhere to the restrictions described in Section 2.4.6. Residual materials and deposition would generally be as described for Alternative A.

Table 2–24. Alternative B Estimated Annual Chaff and Flare Use by Airspace

Airspace	*Chaff*	*Flares*
PR-1A/B ATCAAs	4,000	400
PR-2 MOA/ATCAA	11,500	1,150
PR-3 MOA/ATCAA	4,600	460
PR-4 MOA/ATCAA	5,850	600
Gap A ATCAA	130	10
Gap B MOA/ATCAA	300	30
Gap C MOA/ATCAA	150	20
Gateway East/West ATCAA	3,500	350
Totals	30,030	3,020

2.6.6 Ground-Based Training Assets

The existing electronic range complex consists of the Belle Fourche ESS and numerous emitter and/or simulated threat sites underlying existing MOA and ATCAA airspace. These sites provide training opportunities within the existing Powder River airspace and would continue to support training in the proposed PRTC.

2.7 Alternative C

Alternative C would expand and enhance the airspace and ground assets based on the existing Powder River airspace. Alternative C would include all the common elements described in Section 2.4.

2.7.1 Airspace Structure

For Alternative C, the Air Force would request the FAA to establish all the MOAs, ATCAAs, and Gap MOA ATCAAs defined for the Alternative A with the exception that the PR-4 and the GAP C MOAs would not be included in Alternative C. The PR-4 ATCAAs and the Gap C ATCAAs would be included in Alternative C. Figure 2-11 includes the MOA/ATCAA details of Alternative C.

2.7.2 Airspace Operations

Under Alternative C, the primary users of the airspace would be the B-1s and B-52s. Table 2-25 compares the local annual sorties under PRTC Alternative C with the baseline or existing Powder River airspace sorties. Alternative C would be comparable to Alternative B and aircrews would use remote training complexes at a higher rate than with Alternative A. Approximately 76 percent of training would occur locally within PRTC Alternative C. While this would constitute a substantial improvement over Powder River airspace baseline conditions, local training would be lower than Alternative A and similar to Alternative B except over a different geographic area. The inclusion of PR-1A and PR-1B MOAs in Alternative C would support quality low-level training to meet siting criteria for mountainous terrain following training as noted in Section 2.3.1.2.

Table 2–25. Annual Sortie Comparison Between Baseline and Alternative C

	Existing				Alternative C				Change		Total B-1 and B-52
Sortie	*B-1*	*%*	*B-52*	*%*	*B-1*	*%*	*B-52*	*%*	*B-1*	*B-52*	
Local	1,000	46%	300	31%	1,940	76%	722	76%	+940	+422	+1,362
Remote	1,160	54%	650	69%	600	24%	228	24%	-560	-422	-982

B-1s would be the primary users of the MOAs while B-1s and B-52s would share the ATCAAs. Table 2-26 provides the Alternative C estimated and baseline sortie-operations in the MOA and ATCAA airspaces for all aircraft during daily and LFE training.

Table 2–26. Alternative C MOA and ATCAA Annual Sortie-Operations Comparison

	Aircraft				
	B-1	*B-52*	*Transient*[1]	*Tankers*	*Total*
Baseline					
MOA	500	0	60	0	560
ATCAA	1,250	1,500	90	0	2,840
Projected					
MOA	1,295	320	297	0	1,912
ATCAA	5,135	1,692	1,137	602	8,566
Increase					
MOA	795	320	237	0	1,352
ATCAA	3,885	192	1,047	602	5,726

Note: 1. Includes F-16, F-15, and F-22 fighter aircraft and others (see Appendix B).

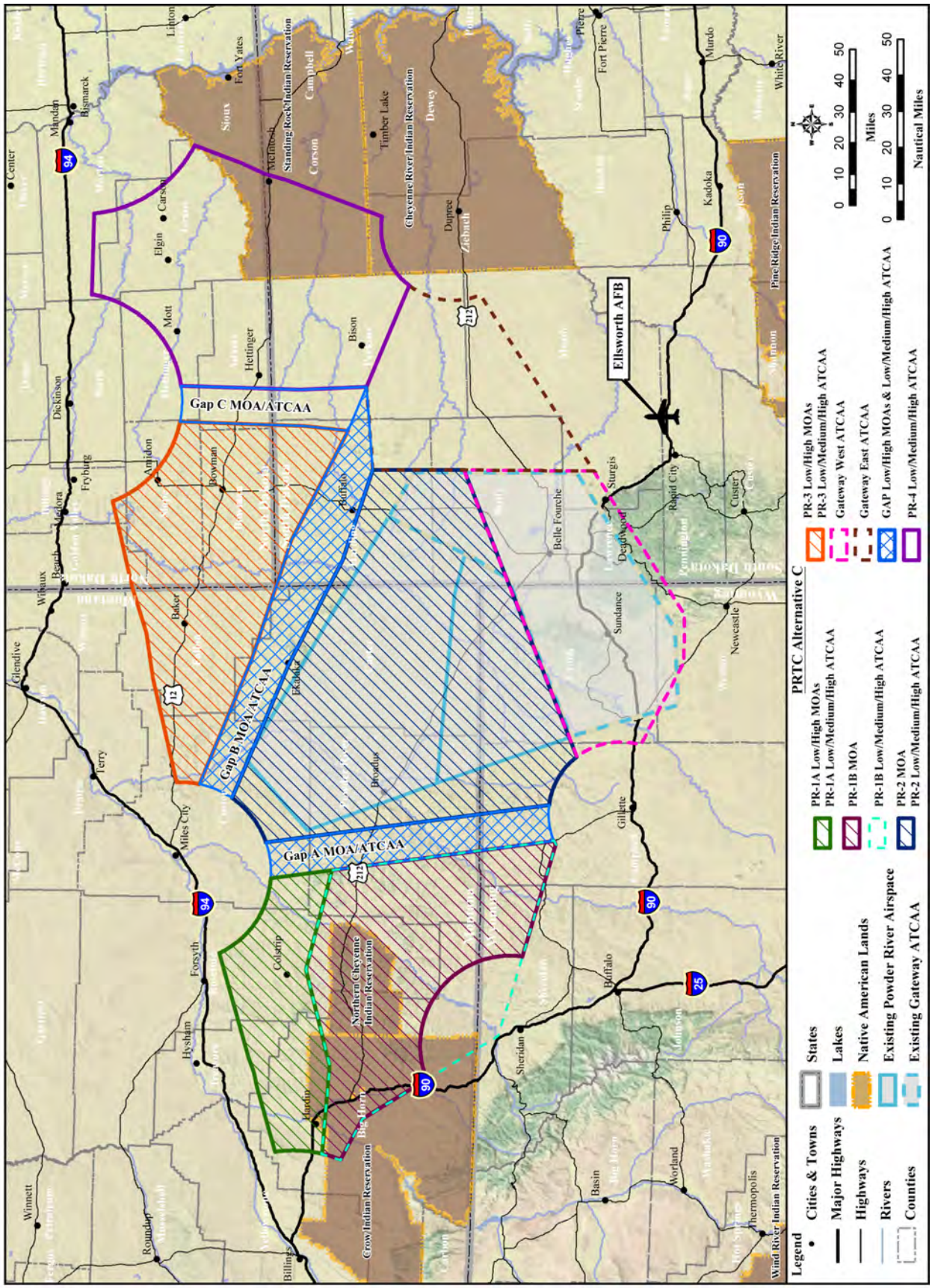


Figure 2-11. Alternative C Airspace

Alternative C annual day-to-day training activity estimated for each aircraft for each altitude within each airspace is presented in Table 2-27. This is the Alternative C estimated annual usage for B-1s, B-52s, transients, and tankers. Transient fighters would be expected to perform most of their sortie-operations during LFEs and tanker aircraft would support training as needed. Table 2-28 presents the Alternative C training hours for an LFE. Table 2-29 combines Tables 2-27 and 2-28 to produce the total Alternative C expected training hours by aircraft, by airspace, and by altitude. Table 2-29 represents the estimated total airspace use with Alternative C. Real world experience and expected missions will change and estimated aircraft training hour distribution would be expected to vary accordingly.

2.7.3 Large Force Exercises

Under Alternative C, LFEs would occur with the same frequency and involve similar operations as described under Alternative A. LFEs would distribute sortie-operations similar to the description under Alternative A with stand-off distances and altitude restrictions to account for the lack of PR-4 MOA and Gap C MOA airspace. Adjustments to account for the different airspace would result in somewhat more traffic in the available airspace. Table 2-28 presents the annual estimated LFE training by aircraft type. Under Alternative C, LFEs would have somewhat higher quality training than under Alternative B because the PR-1B MOA overflies a diversified geographic area suitable for B-1 bomber terrain following tactics.

2.7.4 Supersonic Activity

Alternative C would include B-1 supersonic flight above 20,000 feet MSL during LFEs as described for Alternative A. Although there would be a reduced total amount of day-to-day training, the LFE training and LFE events would be the same as Alternative A. Transient fighter aircraft would operate at supersonic speeds above 10,000 feet AGL during LFEs. Total supersonic activity would match that defined for the Alternative A (refer to Section 2.4.5). Table 2-8 lists the estimated supersonic minutes by aircraft type and altitudes during the expected 10 days of LFEs transient fighters would fly an estimated 100 supersonic events during LFEs. All the B-1 and most of the fighter supersonic activity would occur in the ATCAAs above FL180.

2.7.5 Defensive Countermeasures

With Alternative C, chaff and flare use would follow the same patterns, procedures, and restrictions as described for Alternative A. Alternative C would have approximately the same amount of chaff and flare use as Alternative A as aircrews train for defensive maneuvers. Alternative C total projected chaff and flare use is presented in Table 2-30 from Table 2-9. Table 2-30 gives the total estimated chaff and flare use by airspace for both normal and LFE training. Chaff and flare residual materials would be as described for Alternative A. Restrictions on chaff and flare use would be as described in Section 2.4.6.

2.7.6 Ground-Based Training Assets

The existing electronic range complex consists of the Belle Fourche ESS and numerous emitter and/or simulated threat sites underlying existing MOA and ATCAA airspace. These sites provide training opportunities within the existing Powder River airspace and would continue to support training in the proposed PR-2 MOA/ATCAA.

Table 2-27. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative C (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	274.73	2.78	0.00
	B-52	350/19	75	0.00	13.80	2.42	0.35	0.69	0.58	57.16	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	8.25	2.75	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	0.61	1.49	0.00
PR-2 MOA/ATCAA	**B-1**	1410/290	681.25	34.06	76.64	34.06	17.03	8.52	505.83	5.11	0.00
	B-52	570/30	225	0.00	41.40	7.25	1.04	2.07	1.73	171.52	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	0.75	0.25	0.00
	Transient	6/2	2	0.11	0.11	0.00	0.00	0.38	0.41	0.99	0.00
PR-3 MOA/ATCAA	**B-1**	614/126	370	18.50	41.63	18.50	9.25	4.63	277.50	0.00	0.00
	B-52	59/3	12.5	0.00	2.30	0.40	0.06	0.12	9.60	0.02	0.00
	Tanker	1/1	1	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
	Transient	6/2	3	0.16	0.16	0.00	0.00	0.58	2.10	0.00	0.00
PR-4 ATCAA	**B-1**	0/0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	219/12	190.5	0.00	0.00	0.00	0.00	0.00	190.49	0.01	0.00
	Tanker	9/2	11	0.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00
	Transient	6/2	3	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00
Gap A MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gap B MOA/ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2-27. Estimated Annual Day-to-Day Time and Altitude Distribution, Alternative C (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway East ATCAA	**B-1**	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	0/0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gateway West ATCAA	**B-1**	375/75	168.75	0.00	0.00	0.00	0.00	0.00	167.06	1.69	0.00
	B-52	285/15	75	0.00	0.00	0.00	0.00	0.00	0.75	74.25	0.00
	Tanker	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transient	1/1	1	0.00	0.00	0.00	0.00	0.00	0.29	0.71	0.00
Totals Alternative C	**B-1**	3013/617	1590.0	71.06	159.89	71.06	35.53	17.77	1225.11	9.57	0.00
	B-52	1483/79	578	0.00	57.50	10.07	1.45	2.88	203.15	302.96	0.00
	Tanker	20/6	24	0.00	0.00	0.00	0.00	0.00	21.00	3.01	0.00
	Transient	25/9	12	0.43	0.43	0.00	0.00	1.54	6.41	3.19	0.00

Table 2-28. Estimated Annual LFE Time and Altitude Distribution, Alternative C (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	200/200	99.33	4.97	11.17	4.97	2.48	1.24	59.60	14.90	0.00
	B-52	25/25	20.68	0.00	0.00	0.00	0.00	0.00	0.20	20.28	0.20
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	100/100	36.24	1.96	1.96	0.00	0.00	6.96	8.88	13.95	2.54
PR-2 MOA/ATCAA	**B-1**	200/200	110	5.50	12.38	5.50	2.75	1.38	66.00	16.50	0.00
	B-52	25/25	22.3	0.00	0.00	0.00	0.00	0.00	0.22	21.86	0.22
	Tanker	32/32	4.58	0.00	0.00	0.00	0.00	0.00	3.44	1.15	0.00
	Transient	100/100	41.26	2.23	2.23	0.00	0.00	7.92	10.11	15.89	2.89
PR-3 MOA/ATCAA	**B-1**	200/200	65.82	3.29	7.40	3.29	1.65	0.82	39.49	9.87	0.00
	B-52	25/25	13.34	0.00	0.00	0.00	0.00	0.00	0.14	13.06	0.14
	Tanker	32/32	2.74	0.00	0.00	0.00	0.00	0.00	2.06	0.69	0.00
	Transient	100/100	24.68	1.33	1.33	0.00	0.00	4.74	6.05	9.50	1.73
PR-4 ATCAA	**B-1**	100/100	42.05	0.00	0.00	0.00	0.00	0.00	33.64	8.81	0.00
	B-52	25/25	17.05	0.00	0.00	0.00	0.00	0.00	0.18	16.69	0.18
	Tanker	32/32	57.6	0.00	0.00	0.00	0.00	0.00	43.20	14.40	0.00
	Transient	50/50	15.77	0.00	0.00	0.00	0.00	0.00	5.52	8.67	1.58
Gap A MOA/ATCAA	**B-1**	200/200	14.5	0.73	1.63	0.73	0.36	0.18	8.70	2.18	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	100/100	5.44	0.29	0.29	0.00	0.00	1.04	1.33	2.09	0.38
Gap B MOA/ATCAA	**B-1**	200/200	19.72	0.99	2.22	0.99	0.49	0.25	11.83	2.96	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	7.4	0.40	0.40	0.00	0.00	1.42	1.81	2.85	0.52

Table 2-28. Estimated Annual LFE Time and Altitude Distribution, Alternative C (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C ATCAA	**B-1**	100/100	5.08	0.00	0.00	0.00	0.00	0.00	4.06	1.02	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	50/50	1.91	0.00	0.00	0.00	0.00	0.00	0.67	1.05	0.19
Gateway East ATCAA	**B-1**	100/100	3.59	0.00	0.00	0.00	0.00	0.00	2.87	0.72	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.35	0.00	0.00	0.00	0.00	0.00	0.47	0.74	0.14
Gateway West ATCAA	**B-1**	100/100	39.91	0.00	0.00	0.00	0.00	0.00	31.93	7.98	0.00
	B-52	25/25	16.18	0.00	0.00	0.00	0.00	0.00	0.16	15.86	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	50/50	14.97	0.00	0.00	0.00	0.00	0.00	5.24	8.23	1.50
Totals Alternative C	**B-1**	1400/1400	400.00	15.47	34.80	15.47	7.74	3.86	258.13	64.53	0.00
	B-52	225/225	100.01	0.00	0.00	0.00	0.00	0.00	1.00	98.01	1.00
	Tanker	288/288	127.99	0.00	0.00	0.00	0.00	0.00	95.99	32.00	0.00
	Transient	700/700	149.02	6.21	6.21	0.00	0.00	22.08	40.08	62.98	11.45

Table 2-29. Estimated Annual Combined Use LFEs and Day-to-Day Time and Altitude Distribution, Alternative C (Page 1 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 – 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
PR-1A/B MOAs/ATCAAs	**B-1**	814/326	469.33	23.47	52.80	23.47	11.73	5.87	334.32	17.67	0.00
	B-52	375/44	95.68	0.00	13.80	2.42	0.35	0.69	0.78	77.44	0.20
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	51.45	17.15	0.00
	Transient	106/102	39.24	2.12	2.12	0.00	0.00	7.53	9.49	15.44	2.54
PR-2 MOA/ATCAA	**B-1**	1610/490	791.25	39.56	89.02	39.56	19.78	9.89	571.83	21.61	0.00
	B-52	595/55	247.3	0.00	41.40	7.25	1.04	2.07	1.95	193.38	0.22
	Tanker	33/33	5.58	0.00	0.00	0.00	0.00	0.00	4.19	1.40	0.00
	Transient	106/102	43.26	2.34	2.34	0.00	0.00	8.31	10.51	16.88	2.89
PR-3 MOA/ATCAA	**B-1**	814/326	435.82	21.79	49.03	21.79	10.90	5.45	316.99	9.87	0.00
	B-52	84/28	25.84	0.00	2.30	0.40	0.06	0.12	9.74	13.08	0.14
	Tanker	33/33	3.74	0.00	0.00	0.00	0.00	0.00	3.05	0.69	0.00
	Transient	106/102	27.68	1.49	1.49	0.00	0.00	5.31	8.15	9.50	1.73
PR-4 ATCAA	**B-1**	100/100	42.05	0.00	0.00	0.00	0.00	0.00	33.64	8.41	0.00
	B-52	244/37	207.55	0.00	0.00	0.00	0.00	0.00	190.67	16.70	0.18
	Tanker	41/34	68.6	0.00	0.00	0.00	0.00	0.00	54.20	14.40	0.00
	Transient	56/52	18.77	0.00	0.00	0.00	0.00	0.00	8.52	8.67	1.58
Gap A MOA/ATCAA	**B-1**	200/200	14.5	0.73	1.63	0.73	0.36	0.18	8.70	2.18	0.00
	B-52	25/25	2.94	0.00	0.00	0.00	0.00	0.00	0.02	2.90	0.02
	Tanker	32/32	0.6	0.00	0.00	0.00	0.00	0.00	0.45	0.15	0.00
	Transient	100/100	5.44	0.29	0.29	0.00	0.00	1.04	1.33	2.09	0.38
Gap B MOA/ATCAA	**B-1**	200/200	19.72	0.99	2.22	0.99	0.49	0.25	11.83	2.96	0.00
	B-52	25/25	4	0.00	0.00	0.00	0.00	0.00	0.04	3.92	0.04
	Tanker	32/32	0.82	0.00	0.00	0.00	0.00	0.00	0.62	0.21	0.00
	Transient	100/100	7.4	0.40	0.40	0.00	0.00	1.42	1.81	2.85	0.52

Table 2-29. Estimated Annual Combined Use LFEs and Day-to-Day Time and Altitude Distribution, Alternative C (Page 2 of 2)

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @ Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1,000 – 1,999 AGL HR/YR*	*Time @ Altitude 2,000 - 4,999 AGL HR/YR*	*Time @ Altitude 5,000 – 9,999 AGL HR/YR*	*Time @ Altitude 10,000 AGL – 17,999 MSL HR/YR*	*Time @ Altitude 18,000 – 25,999 MSL HR/YR*	*Time @ Altitude 26,000 - 36,999 MSL HR/YR*	*Time @ Altitude 37,000 - 60,000 MSL HR/YR*
Gap C ATCAA	**B-1**	100/100	5.08	0.00	0.00	0.00	0.00	0.00	4.06	1.02	0.00
	B-52	25/25	2.06	0.00	0.00	0.00	0.00	0.00	0.02	2.02	0.02
	Tanker	32/32	0.42	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.00
	Transient	50/50	1.91	0.00	0.00	0.00	0.00	0.00	0.67	1.05	0.19
Gateway East ATCAA	**B-1**	100/100	3.59	0.00	0.00	0.00	0.00	0.00	2.87	0.72	0.00
	B-52	25/25	1.46	0.00	0.00	0.00	0.00	0.00	0.02	1.42	0.02
	Tanker	32/32	0.3	0.00	0.00	0.00	0.00	0.00	0.23	0.08	0.00
	Transient	50/50	1.35	0.00	0.00	0.00	0.00	0.00	0.47	0.74	0.14
Gateway West ATCAA	**B-1**	475/175	208.66	0.00	0.00	0.00	0.00	0.00	198.99	9.67	0.00
	B-52	310/40	91.18	0.00	0.00	0.00	0.00	0.00	0.91	90.11	0.16
	Tanker	32/32	3.33	0.00	0.00	0.00	0.00	0.00	2.50	0.83	0.00
	Transient	51/51	15.97	0.00	0.00	0.00	0.00	0.00	5.53	8.94	1.50
Totals Alternative C	**B-1**	4413/2017	1990	86.53	194.69	86.53	43.27	21.63	1483.24	74.10	0.00
	B-52	1708/304	678.01	0.00	57.50	10.07	1.45	2.88	204.15	400.97	1.00
	Tanker	308/294	151.99	0.00	0.00	0.00	0.00	0.00	116.99	35.00	0.00
	Transient	725/709	161.02	6.64	6.64	0.00	0.00	23.62	46.49	66.17	11.45

Table 2-30. Alternative C Estimated Annual Chaff and Flare Use by Airspace

Airspace	*Chaff*	*Flares*
PR-1A/B MOAs/ATCAAs	6,000	600
PR-2 MOA/ATCAA	11,500	1,500
PR-3 MOA/ATCAA	4,600	450
PR-4 MOA/ATCAA	4,000	400
Gap A MOA/ATCAA	200	20
Gap B MOA/ATCAA	300	30
Gap C MOA/ATCAA	90	10
Gateway East/West ATCAA	3,500	350
Totals	30,190	3,360

2.8 No-Action Alternative

The No-Action Alternative would not create the PRTC or expand training airspace. The No-Action Alternative represents continued use of the existing Powder River airspace for training at baseline levels. Figure 2-1 includes the existing Powder River airspace. Use of remote complexes, depicted in Figure 1-1, for training would continue to expend a substantial number of flying hours. Combat readiness would be impaired and training with system upgrades would not be accommodated.

Baseline conditions for the bases and the airspace can differ depending upon deployments to combat areas. Deployments take away aircraft and reduce use of the airspace. Over the past several years, one squadron of B-1s from Ellsworth AFB has been deployed regularly in the Overseas Contingency Operation. When aircrews prepare to deploy, they have an increase in their required level of flight activity and training. When aircrews return from deployments, they must re-qualify and become mission capable in new tactics, aircraft upgrades, threats, sensor or other activities not available in foreign airspace, or activities prohibited in combat zones. These training requirements increase sorties and training from Ellsworth AFB and Minot AFB.

All Ellsworth AFB-based and Minot AFB-based squadrons are assumed to be training, to the extent possible, in Powder River airspace as the baseline for this EIS. This approach ensures that analysis of the impacts from the No-Action Alternative consistently examines the full potential B-1 operations and is not affected by temporary changes, such as a decrease in training with deployment or an increase in training such as from Dyess AFB B-1s relocating to Ellsworth AFB during extended runway work at Dyess AFB during 2008.

2.8.1 Airspace Structure

The existing Powder River airspace includes Powder River A and B MOAs. Powder River A extends from the surface up to but not including FL180 (refer to Figure 2-1). Powder River B MOA has a floor of 1,000 feet AGL and a ceiling up to, but not including, FL180. For the purpose of this EIS, the Powder River airspace includes four ATCAAs: Powder River, Gateway, Crossbow, and Black Hills. As noted in Section 2.1.2, Crossbow is not considered a part of the Powder River airspace. Extending from FL180 up to FL260, the Powder River ATCAA directly overlies the Powder River MOAs. The Gateway ATCAA provides airspace from FL180 up to FL260 and extends about 40 NM southeast from the Powder River ATCAA. The Crossbow ATCAA extends from FL270 up to FL450. The horizontal footprint conforms to the Powder River and Gateway ATCAAs and the airspace is managed to not have a 1,000-foot vertical gap between the ceiling of the lower ATCAAs and the floor of the Crossbow ATCAA. With a narrow vertical extent (18,000 to 20,000 feet MSL), the Black Hills ATCAA partially overlaps within the Gateway ATCAA and

extends roughly 80 NM south-southwestward from it. About 25 percent of the 50 NM-wide Black Hills ATCAA coincides with the Gateway ATCAA. The Black Hills ATCAA also provides refueling airspace for AR-678. Table 2-31 presents the estimated square miles under the existing Powder River airspace for the No-Action alternative.

Table 2-31. Surface Overflown by Existing Powder River Airspace (Square Miles), No-Action Alternative

Airspace Type	*Airspace Unit*	*No Action Alternative*
MOA	Powder River A	4,026.82
	Powder River B	1,828.24
TOTAL MOA		5,855.06
ATCAA	Powder River	5,855.06
	Gateway	3,892.98
	Crossbow[1]	9,748.04
	Black Hills[2]	4,322.66
TOTAL ATCAA[3]		14,070.69

Notes:

1. Crossbow ATCAA overlies Powder River ATCAA and Gateway ATCAA
2. Estimate does not double count portion of Black Hills ATCAA within Gateway ATCAA
3. Total area under the ATCAAs includes Crossbow ATCAA and portion of Black Hills ATCAA not included in the Crossbow ATCAA.

2.8.2 Airspace Operations

Under no-action (or baseline) conditions, B-1s would continue to conduct approximately 1,000 sortie-operations in each of the MOAs and the ATCAAs, with the majority occurring between 7 a.m. and 10 p.m. Table 2-32 presents baseline condition B-1s, B-52s, and other users training in the Powder River airspace. Approximately 24 hours of transient operations occur annually, primarily conducted by F-16s. All current restrictions on flight activities and avoidance areas would remain in place, and the Air Force's policies and procedures for defining such areas would continue to apply. Simulated ordnance delivery training would continue with the use of the Belle Fourche ESS and emitter and target sites (see Figure 2-3).

As Table 2-32 presents, B-1s spend an average of 250 hours annually in the MOAs and operate 625 hours in the ATCAAs. The B-52s currently perform nearly all of their Powder River airspace training in the ATCAAs. F-16s and other transients fly fewer than 4 hours per year below 2,000 feet AGL.

Table 2-32. Powder River Airspace Average Annual Baseline Training Hours

Airspace Unit	*Aircraft*	*# of Sortie Ops Day/Night*	*Time Spent In Airspace HR/YR (Total)*	*Time @Altitude 500 - 999 AGL HR/YR*	*Time @ Altitude 1000 - 1999 AGL HR/YR*	*Time @ Altitude 2000 - 4999 AGL HR/YR*	*Time @ Altitude 5000 - 9999 AGL HR/YR*	*Time @ Altitude 1000 - 17999 AGL HR/YR*	*Time @ Altitude 18000 - 23999 AGL HR/YR*	*Time @Altitude 24000 - 60000 AGL HR/YR*
Powder River A MOA	**B-1**	200/50	125.00	25.00	56.25	25.00	12.50	6.25	0.00	0.00
	B-52	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	22/8	5.00	0.90	0.90	0.00	0.00	3.20	0.00	0.00
Powder River B MOA	**B-1**	200/50	125.00	25.00	56.25	25.00	12.50	6.25	0.00	0.00
	B-52	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	22/8	5.00	0.90	0.90	0.00	0.00	3.20	0.00	0.00
Powder River ATCAA	**B-1**	622/128	375.00	0.00	0.00	0.00	0.00	0.00	300.00	75.00
	B-52	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	22/8	3.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
Crossbow ATCAA	**B-1**	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B-52	1,425/75	300.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	22/8	8.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
Gateway ATCAA	**B-1**	415/85	250.00	0.00	0.00	0.00	0.00	0.00	200.00	50.00
	B-52	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	22/8	3.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
Totals	**B-1**	1,437/313	875.00	50.00	112.50	50.00	25.00	12.50	500.00	125.00
	B-52	1,425/75	300.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00
	Tanker	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F-16	110/40	24.00	1.80	1.80	0.00	0.00	6.40	6.00	8.00

Note: Assumes no B-1s are deployed and Powder River A/B MOA airspace saturation.

2.8.3 Large Force Exercises

The existing Powder River airspace cannot support any current LFE due to aircraft capabilities and airspace size limitations. Occasional existing training includes F-16 and B-1 aircraft training together. Aircrews would continue to expend flying hours commuting to distant training complexes to participate in realistic LFEs. Training and readiness would continue to suffer.

2.8.4 Supersonic Activity

No supersonic activity would occur within the Powder River airspace. Under the No-Action Alternative, aircrews would commute to approved airspace to acquire supersonic training.

2.8.5 Defensive Countermeasures

No defensive countermeasures can be deployed within the Powder River airspace. Under the No-Action Alternative, aircrews would continue to simulate countermeasure deployment, which does not result in realistic training. Limited opportunities to train with defensive countermeasures would occur when aircrews train in airspace approved for defensive countermeasures.

2.8.6 Ground-Based Training Assets

Section 2.1.3 describes the existing Powder River airspace ground-based assets. These include the Belle Fourche ESS and other locations under or near the Powder River A and B MOAs. These locations would continue to be used for threat emitters, no-drop targets, and/or support facilities.

2.9 Public Involvement

The Air Force initiated early public and agency involvement in the environmental analysis of the proposed PRTC. The Air Force published newspaper advertisements, sent out press releases, and distributed Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) letters. These announcements solicited public and agency input on the proposal and invited the public and agencies to attend community outreach scoping meetings on the PRTC in MT, ND, SD, and WY. Table 2-33 presents the details on the scoping meetings.

Scoping meetings were conducted at communities under and adjacent to the proposed airspace. The participant concerns dealt with, among other things, the ability for people to conduct their lives as they were conducting them in the typically rural settings. Some individuals had remained on family properties, returned to family properties, or moved to the area to be able to experience the rural, relatively undisturbed quality of life such a regional landscape provides. The Northern Cheyenne fought their way back from Oklahoma to occupy their traditional lands.

During scoping, individuals recalled low-level B-1 or B-52 flights (on MTRs) in the area and reminded Air Force and FAA participants that the rural residents are patriotic Americans and continue their support of the military. The participants expressed concern about the uncertainty of low-level overflights and sonic booms and the inability to communicate to find when and where such impacts to their rural lifestyle could occur. Frustration and annoyance at times were present as public scoping participants tried to identify ways, through airspace scheduling, MOA altitudes, or other measures, to reduce uncertainty and impacts.

Table 2-34 presents concerns identified by the public during scoping for this EIS. An EIS section where the concern is addressed is included in Table 2-34.

In many cases, the concern is addressed in other resource sections in addition to the one referenced. For example, the effects of noise on ranching operations are addressed in the referenced section, as well as under “Noise”,” Safety”, and others. As another example, socioeconomics is defined in this EIS as the basic attributes associated with human activities, particularly for population, economic activity, and public services. The issues raised relate to the economic activities and livelihoods of the affected population. These issues are considered in the referenced sections. Environmental justice addresses potential disproportionate adverse impacts on minority and low-income populations. As the largest minority group in the affected area and as a group that has high rates of poverty, Native American issues are specifically addressed. The reader is encouraged to read the entire EIS and not just the sections referenced in Table 2-34.

Table 2-33. Community Outreach Scoping Meetings (2008)

Date	*Location*	*Public & Agency Attendees*
Monday, June 16	Rapid City Library Rapid City, SD	19
Tuesday, June 17	Belle Fourche Community Center Belle Fourche, SD	17
Wednesday, June 18	Crook County Public Library Sundance, WY	7
Thursday, June 19	Carter County Fire Department Gillette, WY	6
Friday, June 20	Sheridan Senior Center Sheridan, WY	7
Monday, June 23	Apsaalooke Center Crow Agency, MT	13
Monday, June 23	Hardin Chamber of Commerce Hardin, MT	10
Tuesday, June 24	Tribal Administration Building Council Chambers Lame Deer, MT	7
Tuesday, June 24	Isabel Bills Community Learning Center Colstrip, MT	23
Wednesday, June 25	Miles Community College Miles City, MT	18
Thursday, June 26	St. Joan of Arc Parish Hall Ekalaka, MT	15
Friday, June 27	Powder River County High School Broadus, MT	15
Tuesday, July 8	Baker High School Baker, MT	10
Wednesday, July 9	Bowman City Hall Meeting Room Bowman, ND	32
Thursday, July 10	Elgin Community Center Elgin, ND	23
Friday, July 11	AJ Agard Community Center, Standing Rock Indian Reservation (North) Fort Yates, ND	4
Friday, July 11	Bear Soldier District Gym, Standing Rock Indian Reservation (South) McLaughlin, SD	2
Monday, July 14	Harding County Memorial Recreation Center Buffalo, SD	22
Tuesday, July 15	Bison School Bison, SD	15
Wednesday, July 16	Multi-Purpose Building, Cheyenne River Indian Reservation Dupree, SD	11

Table 2-34. Scoping Participant Concerns (Page 1 of 3)

Resource	***Issues Raised***	***Primary EIS Section***
Proposed Action	Details of proposed training	2.2
	Alternatives to action	2.3.1
	Opposition to "military expansion"	2.2.2
	General opposition to proposal purpose or need	1.1, 1.2
	Support for proposal	2.1
Airspace/Air Traffic	Restriction of airspace	4.1.4.1.3
	Radio/radar coverage and communication issues	3.3.3.1
	MOA navigation and checking for MOA activity	4.10.3.1.2
	General aviation (agricultural operations,)	4.10.3.1.2
	GPS-IFR approaches should be included for airports under MOA	4.1.4.1.3
	Avoidance areas	4.9.3
	Air Force jets outside of MOA boundary	4.1.4.1.2
	Air Force "buzzing" livestock, people, buildings	4.1.4.1.2
Noise	Noise pollution	4.2
	General negative impacts from noise	4.2.3
	Disruptive vibrations from sonic booms	4.2.1.4
	Property damage from sonic booms	4.2.1.5
	People (startle effect)	4.2.3
	Booms (general fear/annoyance factor)	4.9.3
	Might cause health impacts	4.2.3.5
	Noise effects on domestic animals	4.6.3.1
Safety	Flight safety	4.3.3.1.2
	Impacts from vortices	4.3.3.1.2
	Mid-air collision avoidance	4.1.4.1.3
	Supersonic effects and flight safety	4.3.3.1.2
	Life flight issues (disruption/interference)	4.10.3.1.2
	Fire-fighting planes (disruption/interference)	4.10.3.1.2
	Chaff ingestion by livestock and wildlife	4.6.3.1
	Fire danger—flares	4.3.3.1.3
	Flare fire-energy resource	4.3.3.1.3
	Dud flare safety	4.3.3.1.3
	Air Force response to fires	4.3.3.1.3
Air Quality	General negative effects on air quality	4.4.3.1
	Aircraft emissions effects on human health	4.4.3.1
	Cumulative effects from aircraft emissions and coal	4.4.3.1
	Aircraft emissions (visual impediments)	4.4.3.1
	Cloud formation and sonic booms	4.2.3.10

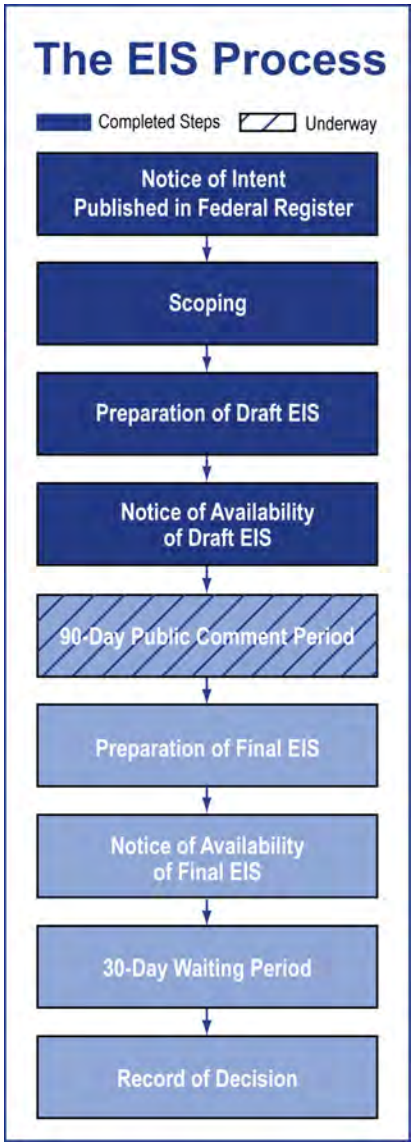
Table 2-34. Scoping Participant Concerns (Page 2 of 3)

Resource	***Issues Raised***	***Primary EIS Section***
Physical Resources (soils, water)	Chaff/flare effects on soil	4.5.3.1
	Chaff/flare effects on water	4.5.3.1
	General chaff litter	4.9.3.1
	Trash/residual materials (falling from aircraft)	4.3.3.1.3
	Who is responsible for cleanup of chaff and "aluminum foil"?	4.3.3.1.3
	Cumulative chaff/flare buildup effects on soil over time	4.5.3.1
	Effects of flare constituents on soils	4.5.3.1
	Effects of fire on soils	4.6.3.1
	Protection of resources against fire, chaff/flare	4.6.3.1
Biological Resources	Overflight noise effects on wildlife	4.6.3.1
	Wildlife (startle effect)	4.6.3.1
	Overflight noise effects on livestock (cows, sheep, goats, etc.)	4.6.3.1
	Livestock (spooking/stampeding)	4.10.3.1.5
	Calving interference	4.10.3.1.5
	Chaff/flare impacts on livestock	4.6.3.1
	Chaff/flare impacts on wildlife	4.6.3.1
	Chaff/flare impacts on vegetation	4.5.3.1
Cultural and Historic Resources	Conflict with Tribal ceremonies	4.7.2.1
	Surveillance of culturally sensitive ceremonies/areas	4.7.2.1
	Impacts to sensitive sites (e.g., Devils Tower, Wind Cave, Bear Butte)	4.7.3.1
	Overflight of Tribal lands	4.7.2.1
Land Use	General quality of life (solace, disruption of the landscape)	4.8.2
	Low-level flight impacts on recreation/outdoor activities	4.8.3.1
	Concerns about restrictions to personal land uses	4.9.1
	Overflight effects on tourist activities	4.8.3.1
	Impacts to recreational flying (e.g., skydiving, gliding, parasailing)	4.1.4.1.4

Table 2-34. Scoping Participant Concerns (Page 3 of 3)

Resource	***Issues Raised***	***Primary EIS Section***
Socioeconomics and Environmental Justice	Energy generation conflicts	4.10.3.1.4
	Hampers development of oil resources	4.10.3.1.4
	Impacts to local oil and gas companies	4.10.3.1.4
	Impacts on wind farms	4.10.3.1.4
	Commercial flight interference	4.1.4.1.3
	General impacts to economy	4.10.3
	Economic impacts to local airports	4.10.3.1.2
	Cost impacts to private pilots (landing fees, fuel, etc.)	4.10.3.1.2
	Loss of visitors to motels/restaurants	4.8.3.1
	Fair compensation for property damages, decreased values, and crop damages	4.3.3.1.3
	Decreased property values	4.10.3.1.1
	General impacts to agriculture	4.10.5.1
	Sonic boom effects on livestock production (milk, calving)	4.10.3.1.5
	Death and loss of livestock due to stampeding	4.3.3.1.3
	Time loss due to spooked and scattered livestock	4.10.3.1.5
	Effects on ranching livelihood	4.8.3.1
	Cause cattle conception/pregnancy rates to decline	4.6.3.1
	Physical/psychological stress to livestock hampers productivity	4.6.3.1
	Weather Modification Flight Interference	4.10.3.1.2
	Indirect economic impacts: effects on agricultural production	4.10.3.1.2
	Indirect economic impacts from flare fire	4.10.3.1.6
	Breach of tribal sovereignty	4.7.2.1
	Hunting seasons Interference	4.8.3.1
Hazardous Materials	Aluminum oxide from chaff	4.5.3.1
	Chemical spraying at emitter sites	4.5.3.1

2.10 NEPA/EIAP Process



This PRTC Draft EIS has been prepared in accordance with NEPA (42 USC 4321-4347), implementing regulations of the Council of Environmental Quality (CEQ 40 CFR § 1500-1508), and 32 CFR 989, *et seq*., *Environmental Impact Analysis Process* (formerly known as AFI 32-7061). In addition, this EIS was prepared in accordance with the current versions of the following FAA orders (available online at www.faa.gov): (1) Order 1050.1E, Environmental Impacts: Policies and Procedures (through Change 1); and (2) Order JO 7400.2G, Procedures for Handling Airspace Matters (through Change 2). An EIS is prepared as a tool for compiling information about a proposal and providing a full and fair discussion of environmental impacts to the natural and human environment. Reasonable alternatives to the proposed action as well as the No-Action Alternative are also evaluated in an EIS. In this Draft EIS, the No-Action Alternative means that there would be no modifications or additions to the current airspace managed by Ellsworth AFB. As described in Section 2.8, this will maintain training conditions as they are today. The Air Force and FAA analyze alternatives to ensure that fully informed decisions are made after review of the comprehensive, multidisciplinary analysis of potential environmental consequences. Compliance with NEPA guidance for preparation of an EIS involves several critical steps depicted in the steps to the right and summarized below.

1. *Announce that an EIS will be prepared*. For this PRTC EIS, a Notice of Intent was published in the *Federal Register* on May 29, 2008.
2. *Conduct scoping.* This is the first major step to identify the relevant issues to be analyzed in depth and to eliminate issues that are not relevant. Scoping for this EIS ran from May 29 through August 4, 2008. Throughout the comment period, the Air Force actively solicited comments through press releases, newspaper ads, public service announcements, flyers, letters, and postcards to the public, local governments, federal and state agencies, Native Americans, and pilot associations. These entities were solicited to ensure that their concerns and comments about the proposal were included in the analyses. In June 2008, the Air Force initiated the IICEP and submitted letters to local, state, tribal and federal agencies informing them of the Air Force's intent to prepare this EIS (Appendix E). More than twenty public or tribal scoping meetings were held in MT, ND, SD, and WY to present details about the proposal, the NEPA process and opportunities for public and agency involvement (refer to Table 2-33). Approximately 276 members of the public and agency representatives attended the meetings. In addition to receiving verbal and written comments at the scoping meetings, the Air Force also received written comments from the public and agencies through the mail. To the extent possible, scoping comments have been used to shape the analysis and focus the issues in this Draft EIS (see Section 2.9). Comments on the Proposed Action and alternatives will continue to be accepted throughout the environmental impact review process.

3. *Prepare a Draft EIS.* The Draft EIS is a comprehensive document for public and agency review. The Draft EIS describes the PRTC purpose and need, explains the Proposed Action and alternatives, presents the existing conditions in the region potentially affected, and provides analysis of the environmental consequences of the Proposed Action and each alternative, including the No-Action Alternative. This Draft EIS has been distributed to agencies, regional libraries, and members of the public who have requested copies to ensure the widest dissemination possible. The public comment period began when the Notice of Availability for this Draft EIS was filed in the *Federal Register*.
4. *Public/Agency Review.* The public comment period is to provide the public and agencies the opportunity to review the Draft EIS and to provide comments on the analysis. This comment opportunity includes a series of public hearings held during the comment period. The hearings give the public and agencies an opportunity to orally comment on the Draft EIS after their review and evaluation of the document. The hearings provide direct feedback to the Air Force from the public and agencies. All comments received during the public comment period are incorporated into the Final EIS. Comments on the Draft EIS need to be provided by the specified date to be sure the comments are included in the Final EIS. Verbal and written comments submitted at public hearings and those received through the mail by the Air Force are given equal consideration in the preparation of the Final EIS.
5. *Prepare a Final EIS.* The Final EIS will be prepared following the public comment period and will address comments submitted during the public comment period or presented at public hearings that address matters within the scope of the EIS. All written comments received will be included in the Final EIS. The Final EIS will revise the Draft EIS to reflect public and agency comments, the Air Force's responses, and additional information received from reviewers. The Final EIS will provide the decision maker with a comprehensive review of the potential environmental consequences of selecting the Proposed Action or an alternative. A Notice of Availability will be published in the *Federal Register* to announce availability of the Final EIS. The FAA, as a cooperating agency, can adopt the Final EIS as the required NEPA documentation to support FAA SUA decisions.
6. *Issue a Record of Decision.* The final step in the NEPA process is approval of the Record of Decision (ROD). The Notice of Availability will begin a 30-day waiting period before the ROD is signed. The ROD will identify which action has been selected by the Air Force decision maker and what management actions or mitigation measures would be carried out to reduce, where possible, adverse impacts to the environment. The ROD specifies the entities responsible for implementing mitigations and the source of funds to implement mitigations.

The goal is for this EIS to satisfy the NEPA requirements for both the FAA and the Air Force. The relevant statutes, regulations, and guidelines are presented in Appendix F. FAA's federal actions are dependent upon the SUA proposal.

2.10.1 FAA Impact Analysis Categories

The FAA considers analysis of an array of environmental resources similar to the Air Force's. Table 2-35 lists those resource analysis categories, as identified in FAA Order 1050.1E (2006), and correlates them with the resources discussed in the PRTC EIS.

Table 2-35. Impact Analysis Categories Identified in FAA Order 1050.1E 2006

FAA Impact Analysis Categories	*How Addressed by PRTC EIS Analyses (relevant PRTC EIS sections in brackets)*	*Comment*
Air Quality	Air Quality (3.4, 4.4)	Change in number of sorties and chaff and flare use
Coastal Resources	Not Applicable	Project airspace is not over or near coast line
Compatible Land Use	Land Use and Recreational Resources (3.8, 4.8)	
Construction Impacts	Not Applicable	No proposed construction
Land Use	Not Applicable	Designation of airspace for military flight operations is not subject to Section 4(f) (49 USC 303 note).
Farmlands	Land Use (3.8, 4.8)	No proposed conversion of farmland to non-agricultural uses
Fish, Wildlife, and Plants	Biological Resources (3.6, 4.6)	
Floodplains	Physical Resources (3.5, 4.5)	No actions will encroach on any floodplain
Hazardous Materials, Pollution Prevention, and Solid Waste	Safety (3.3, 4.3), Physical Resources (3.5, 4.5), and Socioeconomics (3.9, 4.9)	
Historical, Architectural, Archeological, and Cultural Resources	Cultural Resources (3.7, 4.7)	Includes consultation with affected Native American Tribes
Light Emissions and Visual Impacts	Land Use and Recreational Resources (3.8, 4.8)	Proposed action and alternatives include low-level aircraft flights and training with defensive flares
Natural Resources and Energy Supply	Socioeconomics (3.9, 4.9)	
Noise	Noise (3.2, 4.2)	
Secondary (Induced) Impacts	Discussed in each section and in cumulative impacts (5.0)	
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	Socioeconomics (3.9, 4.9) Safety (3.3, 4.3) Environmental Justice (3.10, 4.10)	
Water Quality	Physical Resources (3.5, 4.5)	
Wetlands	Biological Resources (3.6, 4.6)	
Wild and Scenic Rivers	Not applicable	No wild and scenic rivers are located beneath project airspace

Source: FAA Order 1050.1E,

2.11 Comparison of Environmental Consequences

Table 2-36 summarizes the potential environmental consequences of the Proposed Action (Alternative A), Alternative B, Alternative C, and the No-Action Alternative. The detailed analysis behind the summary statements in Table 2-36 is contained in Chapter 4.0, *Environmental Consequences*.

Table 2-36. Summary of Impacts by Resource (Page 1 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Airspace/Air Traffic (EIS Section 4.1)	Two public airports and no private airfields are under PR-1A, Gap A; no public and 1 private under PR-1B; 2 public and 1 private under PR-2; 4 public and 8 private under PR-3/Gap B; 6 public and 2 private under PR-4/Gap C; 12 public and 9 private on the periphery of the proposed MOAs; and 16 public and private under or near the Gateway ATCAAs. Civil aircraft do not rely on IFR below FL180 in much of the area because radar and radio communication are limited. An estimated 129 civil operations impacted Monday through Thursday (approximately one-third of that number on Friday morning) through ground holds/diversions or needing to fly VFR see-and-avoid in an active MOA. MOAs/ATCAAs adjusted to avoid traffic at major airports. Low and High MOAs support civilian IFR traffic. Civil aircraft not able to fly IFR could fly VFR using see-and-avoid, weather permitting. MOA scheduling during Monday-Thursday mornings and late afternoons/evenings and Friday mornings designed to reduce uncertainty, provide times when MOA not activated, and support weekend civilian flights. Training aircraft to be relocated from an area which needed emergency access as is currently done in the Powder River airspace. Agricultural applicators with a near gross weight aircraft concerned about impacts from bombers at low altitude. Communication and coordination required for weather modification, aerial mapping, recreational gliding, and skydiving. Low, Medium, and High ATCAAs allow B-1s to avoid impacting commercial and other traffic during day-to-day training. An ATCAA to FL260 would allow 99 percent of B-1 training; B-52 training and LFEs have potential to significantly impact commercial traffic. Depending on the 4-hour training periods, an LFE above FL260 could impact from 43 to 244 high altitude civilian flights. LFEs would impact all civil aviation seeking to traverse the airspace for a period of 2 to 4 hours. LFEs could to be viewed as a significant impact to airspace users.
Noise (EIS Section 4.2)	Day-night average sound level (DNL) under the proposed PR-1A, PR-1B, PR-3, and PR-4 MOAs would be expected to change from existing less than 45 dB to a calculated <45 to 47 dB range. DNL under existing Powder River A and B MOAs to minimally decline from DNL 49 dB to 47 dB. Noise levels under the existing Gateway ATCAAs would remain below 45 dB DNL. USEPA had identified DNL of 55 dB as level above which to assess public health and welfare. Increased noise levels or sudden low overflight noise would be noticed and could be perceived as a significant impact by residents under the airspace. Overflight of a bomber 2,000 feet AGL or below within one-quarter mile of the flight path expected to occur over 2 to 4 percent of each MOA each training day or an average at any location of 6 to 9 low-level overflights per year (could be more or fewer than average at any specific location). MOAs scheduled in the mornings and late afternoon/evening to somewhat reduce uncertainty of low-altitude flights. Rapid B-1 acceleration and climb with afterburners creates a localized single event onset rate adjusted sound exposure level (SEL_r) of 133 db. While operating at high speeds at 500 AGL, B-1 aircraft generate SEL_r of 117 dB. B-52 aircraft generate SEL_r of 100 dB during overflight at 1,000 feet AGL. Sudden onset sounds can be startling to humans and animals and has resulted in damage to penned cattle and fencing. Sudden low-level overflights identified as an impact by public. Air Force to extend Powder River airspace policy of establishing seasonal avoidance areas to reduce potential for ranching and cultural impacts. Supersonic during 10 days of LFEs with B-1s above FL200 and fighters above 12,000 feet AGL could result in an average of one sonic boom per day at any given location on the ground. Most sonic booms heard as thunder although each boom could result in local areas experiencing an overpressure of 4 psf or greater. Glass, plaster, and other structural elements, normally in good condition, would not be expected to fail as a result of overpressures but failure would be possible. Should a sonic boom or low-level overflight occur during a hunting or ranching operation, it could result in a reaction on the part of the animals. Reactions not likely to significantly impact the species but could be an annoyance to persons on the ground.

Table 2-36. Summary of Impacts by Resource (Page 2 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
Public airports, private airfields, and civilian aircraft flights below FL180 impacted in PR-2, PR-3, PR-4, and associated Gap MOAs as described for Alternative A. No PR-1A, PR-1B, or Gap A MOAs would be established under ATCAAs and aircraft and airports within the Billings-Miles City-Gillette triangle below FL180 would not be impacted below FL180. Estimated 97 civil operations impacted Monday through Thursday (approximately one-third of that number on Friday morning) when the Alternative B MOAs activated. Impacts a mix of ground delays, re-routing, or having to fly VFR see-and-avoid, weather permitting, in active MOA. ATCAA impacts same as Alternative A. LFE impacts as described for Alternative A with exception that Alternative B would not include military training overflights below FL180 in the Billings-Miles City-Gillette triangle.	Public airports, private airfields, and civilian aircraft flights below FL180 impacted in PR-1A, PR-1B, PR-2, PR-3, and associated Gap MOAs as described for Alternative A. There would be no impacts below FL180 under PR-4 or Gap C ATCAAs or to airports or airfields in the Bismarck-Dickinson-Rapid City triangle below FL180. Estimated 79 civil operations impacted Monday through Thursday (approximately one-third of that number on Friday morning) when Alternative C MOAs active. Impacts include delays, re-routing, or having to fly see-and-avoid, weather permitting, in an active MOA. ATCAA impacts same as Alternative A. LFE impacts as described for Alternative A with exception that Alternative C would not include military training flights below FL180 in Bismarck-Dickinson-Rapid City triangle.	No-Action Alternative would not change projected baseline conditions with B-1 and B-52 flight training in the Powder River A/B MOAs (nearly all of the proposed PR-2 MOA). Projected baseline conditions with aircraft from overseas activities expected to increase annual sortie operations in the existing Powder River airspace. Estimated 7 civilian operations impacted weekdays by delay, re-routing, or having to fly VFR see-and-avoid in an active MOA. Flight training in Powder River ATCAAs would continue as permitted under existing letters of agreement with the FAA. Powder River airspace would continue to provide limited training to B-1 and B-52 aircrews.
Noise under PR-2, PR-3, PR-4, and associated Gap MOAs and ATCAAs would be as described for Alternative A. 6 to 9 low-altitude overflights per year, an average of one sonic boom per LFE day, and startle effects in these MOAs as described under Alternative A. Low-level overflights would not occur under PR-1A, PR-1B, or Gap A ATCAAs. Noise under these areas would be less than DNL 45 dB.	Noise under PR-1A, PR-1B, PR-2, PR-3, and associated Gap MOAs and ATCAAs would be as described for Alternative A. 6 to 9 low-altitude overflights per year, an average of one sonic boom per LFE day, and startle effects in these MOAs as described under Alternative A. Low-level overflights would not occur under PR-4 or Gap C ATCAAs. Noise under these areas would be less than DNL 45 dB.	Noise under the existing Powder River airspace would continue at DNL 49 dB as the base returns to the peacetime operational tempo. Low-altitude startle effects would continue to be experienced within Powder River A/B MOAs. Supersonic flight would not be authorized.

Table 2-36. Summary of Impacts by Resource (Page 3 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Safety (EIS Section 4.3)	Limited communication and radar coverage impact safe civil aircraft operations below 12,000 feet MSL in much of the proposed airspace and below FL180 in some areas. Impacts highest in PR-3, the western portion of PR-4, existing PR-2, and the eastern portion of PR-1A and PR-1B. No proposal for increased radio frequency coverage or radar coverage for the PRTC airspace. General aviation pilots accustomed to flying through the airspace with GPS coordinates perceived requirement to call the Ellsworth AFB airspace management office to determine status of the proposed MOAs as an impact to their transit of the airspace. Air Force proposes to reduce potential flight safety impacts to commercial and other aircraft above FL300 by letters of agreement with the FAA to restrict use of most Medium and High ATCAAs to LFEs. During LFEs the use of ATCAA airspace to FL600 would be available for training above FL300 during limited periods. MOAs provide access to large commercial airports such as Billings and Bismarck. Proposed Low and High MOAs designed to reduce impacts to IFR traffic. Class A mishap and bird strikes expected to be proportional to the amount of training time in the proposed airspace with some increased risk in PR-3 and PR-4 MOAs. Chaff or flare residual materials not expected to result in a safety impact; finding a piece of chaff or flare material on the ground could annoy persons. Flare use restricted to above 2,000 feet AGL and discontinued in airspace with extreme fire conditions not expected to increase fire risk. Risk from estimated one dud flare falling every three years or being found under PRTC very low. Startle effects from low-altitude overflight or sonic booms during LFEs could impact the safety of recreationists or ranchers. Low-altitude flights during training would overfly any location within one-quarter mile by an aircraft flying 2,000 feet AGL or below an average of 6 to 9 times per year. The number of actual overflights experienced by any location could be more or fewer then average. An unexpected low-altitude overflight could have safety impacts to a recreationist on a horse or a rancher working cattle in open range. Temporary avoidance areas could be established to reduce the potential for impacts from low-altitude overflight. Communication regarding seasonal ranching operations, combined with implementing avoidance areas, could reduce impacts to ranching. Large aircraft wake vortex of air turbulence at the wing tips could, in rapid maneuvering and unusual meteorological conditions, damage windmills. Atmospheric conditions and winds such as those common to the ROI cause accelerated vortex decay and dissipation. Most wake vortices would not reach ground level but could be seen as potential impact to crop dusters or other small aircraft. Significant impacts could result from aircraft electronic emissions inadvertently setting off mining or construction explosives or otherwise impacting operations. Procedures would be required to communicate with mining operators regarding potential interference with mining radio frequencies.
Air Quality (EIS Section 4.4)	No significant air quality impacts with Alternative A. B-1 and B-52 low-level overflight in PR-1 and PR-1B would contribute approximately 1.65 tons of PM_{10} per year within the Lame Deer nonattainment area and 0.02 tons of PM_{10} per year within the Sheridan nonattainment area. Emissions not expected to increase the number of days when the PM_{10} air quality standard is exceeded. B-1 and B-52 training aircraft would not produce enough emissions to affect air quality or visibility to nearest PSD Class I areas (Wind Caves National Park and Badland National Park) or the Northern Cheyenne Reservation. Defensive flare emissions are insignificant. National greenhouse gas (GHG) emissions would not substantially change from the No-Action Alternative under which B-1 and B-52 aircraft would continue to fly essentially the same amount of time to achieve lesser quality training.
Physical Sciences (EIS Section 4.5)	No construction or direct impact to water or soils. Chaff particles on the surface would be chemically stable and subject to mechanical degradation. Soils pH is outside the range necessary to degrade the aluminum coating on chaff particles. Chaff and flare residual materials would be inert and not in sufficient quantities to impact physical resources. No impact to soils or water bodies expected.

Table 2-36. Summary of Impacts by Resource (Page 4 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
Alternative B includes same communication, flight safety, and ground safety impact under PR-2, PR-3, PR-4, and associated Gap MOAs and ATCAAs as explained for Alternative A. Under the PR-1A, PR-1B, and Gap A ATCAAs there would be no low-altitude startle effects and few environmental impacts other than very infrequent sonic booms and chaff and flare residual materials; no mining impacts under PR-1A/1B ATCAAs.	Alternative C includes same communication, flight safety, and ground safety impacts under PR-1A, PR-1B, PR-2, PR-3, and associated Gap MOAs and ATCAAs as explained for Alternative A. No low-flying startle or other environmental effects from aircraft under the PR-4 and Gap C ATCAAs. Few impacts from infrequent sonic booms and chaff and flare residual materials under PR-4 and Gap C ATCAAs.	No changes to Powder River airspace. Low-level overflights continue in the Powder River A/B MOAs, and communication would continue to be required to identify seasonal avoidance areas and reduce impacts from low-level overflight to ranching or recreational activities.
No significant air quality impacts with Alternative B. No low-level overflight in PR-1A or PR-1B. Aircraft training operations would not fly over or otherwise impact any Federal PSD Class I areas. National GHG emissions would not substantially change from the No-Action Alternative under which B-1 and B-52 aircraft would continue to fly essentially the same amount of time to achieve lesser quality training.	No anticipated air quality impacts. Potential effects to air quality would be comparable to those described under Alternative A, including low-level overflight in Lame Deer and Sheridan non-attainment areas (PR-1A and PR-1B). National GHG emissions would not substantially change from No-Action Alternative.	No anticipated air quality impacts. Overflights below 3,000 feet AGL would continue within Powder River A/B MOAs.
Physical effects would be the same as those described for Alternative A.	Alternative C physical effects would be the same as those described under Alternative A.	The No-Action Alternative would not affect physical resources under the Powder River airspace.

Table 2-36. Summary of Impacts by Resource (Page 5 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Biological Sciences (EIS Section 4.6)	Loud, sudden noises combined with a visual stimulus produce the most intense reaction by animals. Most species within the areas under the proposed PRTC already occupy comparable environments under the Powder River A/B MOAs where low-level overflights occur. Sound exposure levels (SEL) above 40 dB are associated with a number of behaviors such as retreat from the sound, freezing, or a strong startle response. Animals under the newly proposed PR-1A, PR-1B, PR-3, PR-4, and associated Gaps MOAs expected to be temporarily more sensitive to noise due to lower previous exposure. Animals typically exhibit continually decreasing responses to noise exposure suggesting habituation. Minimal to no effects to threatened, endangered, and other special status species including greater sage-grouse or rare migrants, such as the piping plover, least tern, whooping crane, or yellow-billed cuckoo. Any impact to sensitive species would likely be short-term and unlikely to significantly affect the population. Potential bird aircraft strikes in PR-2 and PR-4 Low MOAs where migratory flyways converge. If migratory bird species involved in bird aircraft strike, it would be considered an incidental taking and would be exempt from any permitting requirement. An infrequent special status bird aircraft strike would not be expected to adversely affect any populations. No evidence of chaff and flare residual materials or chaff fibers affecting wildlife or domestic animals through ingestion, inhalation, or direct body contact. The potential for fire as a result of Air Force activity is minimal and not considered a significant risk to wildlife habitat quality or quantity.
Cultural and Historic Resources (EIS Section 4.7)	As of spring 2010, there were 239 National Register of Historic Places (NRHP) properties under Alternative A airspace. Impacts to cultural resources could occur from low-level overflights or supersonic noise during LFEs. Sonic booms are normally experienced as distant thunder although each boom could result in local areas experiencing an overpressure of 4 psf or greater. Infrequent and random sonic booms are not expected to have structural damage to historic buildings, but bric-a-brac could be vibrated off shelves and structures subject to a focus boom could be impacted. Even infrequent sonic booms at historic landmarks, such as Bear Butte, national monuments, such as Devils Tower or the Little Bighorn Battlefield, or locations such as the Deadwood Historic District could be seen as intrusions. Sudden and random overflights of the Little Bighorn Battlefield would not be below 2,000 feet AGL. The estimated 6 to 9 low-level overflights per year would not be expected to be perceived as a significant intrusion to the national monument. The change in setting created by increased noise from low-altitude overflights and even infrequent sonic booms would be expected to have an adverse impact upon traditional cultural properties and cultural landscapes. Visual intrusions can include overflights of a Tribal ceremony or residual materials from chaff and flares. Amish and Hutterite settlements may be similarly impacted under proposed PR-1B MOA. During consultations, Native Americans from the four directly impacted reservations explained that low-level overflights and intrusive noise would be detrimental to their cultural practices. The change in setting created by increased noise and low-level training overflights could be seen as a significant impact to Native American Reservations. An estimated annual 6 to 9 low-level overflights of the agricultural portions of the Standing Rock Reservation could occur. Only a small corner of the Cheyenne River Reservation is under the proposed PR-4 MOA and low-level overflights would be expected. Populated portions of the Crow Reservation and all residents of the Northern Cheyenne Reservation would experience low-level overflight, on average, 6 to 9 times per year. The Air Force would establish reasonable temporary or seasonal avoidance areas or could adopt other measures identified in Government-to-Government consultation with affected Tribes to reduce intrusive impacts.

Table 2-36. Summary of Impacts by Resource (Page 6 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
Alternative B has same effects as Alternative A with exception that the more environmentally diversified area and higher terrain under the PR-1A, PR-1B, and Gap A ATCAAs would not be subject to low-level overflights. This would result in no low-altitude noise impacts to species in those areas. Impacts to other areas of proposed low-altitude airspace as described for Alternative A.	Alternative C has same effects as those described for Alternative A with exception that the more agricultural area under the proposed PR-4 and Gap C ATCAAs would not be subject to low-level overflights. This would result in no expected low-altitude startle impacts or bird-aircraft strikes to species in those areas. The more environmentally diversified area under the PR-1A, PR-1B MOAs included in Alternatives A and C. Alternative C biological effects less than Alternative A, but somewhat greater than Alternative B.	Low-level overflight of the Powder River A/B MOAs would continue. Existing biological conditions would continue.
Alternative B has 202 NHRP listed properties under the airspace with impacts similar to those described for Alternative A. The exception is that there would be reduced impacts on the Crow and Northern Cheyenne Reservations under PR-1A and PR-1B ATCAAs when compared with Alternative A. No low-level overflight over the Little Bighorn Battlefield National Monument or the Tongue River Cultural Landscape. Intrusions to sites under the PR-1A/1B ATCAAs from infrequent sonic booms and not from low-level overflights. Effects to Devils Tower, Bear Butte, the Deadwood Historic District, and other historic locations could occur as under Alternative A. Portions of the Standing Rock and Cheyenne River Reservation would be affected by low-altitude overflights and sonic booms although populations not concentrated in areas overflown. Impacts to cultural resources would be as described for Alternative A.	Alternative C has 208 NHRP listed properties under the airspace with impacts similar to those described for Alternative A. The exception is that Alternative C would not have low-altitude training over the Standing Rock and Cheyenne River Reservations. Impacts from infrequent sonic booms and low-level overflights would generally be comparable to those described for Alternative A, including impacts to the Little Bighorn Battlefield and Traditional Cultural Places under the PR-1A/1B MOAs. Portions of the Crow and all of the Northern Cheyenne Reservations would be affected by an average of 6 to 9 low-level overflights and an average of 1 sonic boom per day during the 10 LFE days per year. Impacts to cultural resources would be as described for Alternative A.	There would be no change to overflight of historic properties within the Powder River airspace. PR-A and PR-B MOAs do not overlie Native American Reservations.

Table 2-36. Summary of Impacts by Resource (Page 7 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Land Use (EIS Section 4.8)	Land uses under the existing Powder River airspace have been overflown by a variety of military aircraft for 20 years. Public concerns at scoping included the effect of sonic booms and low-level overflight on use of the land. Land uses under Powder River airspace within WY, SD, and MT are comparable to those in other portions of the area proposed for the PRTC airspace. Supersonic training scheduled only during LFEs and an estimate of one sonic boom per LFE day (10 days per year) projected to occur toward the center of the airspace and not expected to impact land uses. Low-level overflight activity could cause individual annoyance and could result in sleep disturbance or temporarily interfere with personal communication. Approximately 2 to 4 percent of the MOAs would be overflown by an aircraft 2,000 feet AGL or below on a daily basis. The random nature of the aircraft overflight could result in any location under each MOA being overflown an average of approximately 6 to 9 times per year (any given location could be overflown more or less frequently). Overflight is not expected to impact overall land use although some individuals could be annoyed. Low-level overflight impacts to ranching land uses could be reduced through communication with Air Force to identify temporary avoidance areas. Hunting and other recreational land uses may be disturbed by infrequent low-level military flights but overall land use not expected to be impacted. Recreation from Friday noon through Monday morning not expected to be impacted when military training would generally not be scheduled. Land use for energy development not expected to be impacted assuming electronic emissions coordinated for mine and construction safety. Chaff or flare residual debris, which consists of plastic pieces or wrapping material, would not be expected to affect land uses but could cause annoyance if found.

Table 2-36. Summary of Impacts by Resource (Page 8 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
Alternative B land use effects comparable to those described for Alternative A. Areas under the PR-1A, PR-1B, and associated Gap A ATCAAs not subject to low-level overflight. In these areas, land uses not affected and civilian flights below FL180 not affected. Remainder of Low MOA airspace subject to low-level overflight an average of approximately 6 to 9 times per year. These events and infrequent supersonic events would not be expected to impact land use although this could be seen as an annoyance to persons using the land.	Alternative C land use effects comparable to those described for Alternative A. Areas under PR-4 and associated Gap C ATCAAs not subject to low-level overflight. Land use or civilian flights below FL180 in these areas not affected. Remainder of airspace subject to low-level overflight and intermittent sonic booms as described for Alternative A. An estimated annual average of 6 to 9 low-level events would be experienced by residents living under the Low MOAs. Land use not expected to be impacted although low-level and infrequent supersonic events could be seen as an annoyance to persons using the land.	No-Action Alternative would not change effects upon land use under the existing Powder River airspace.

Table 2-36. Summary of Impacts by Resource (Page 9 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Socioeconomics (EIS Section 4.9)	Estimated 129 civilian aircraft operations under the airspace during Monday through Thursday (approximately one-third of that number on Friday morning) could be impacted by delay, re-routing, needing to fly VFR in an active MOA, or not being able to fly IFR. Delays of 2 to 4 hours and could be seen as an economic impact at public airports and private airfields under airspace. FAA to limit training above FL300 to avoid significant impacts upon air carrier economics and regional and national air traffic. During LFEs entire airspace unavailable for IFR or overflight traffic for a period of 2 to 4 hours per day for 1 to 3 days per quarter. LFE civil aviation impacts expected to include from 43 to 244 daily operations above FL180 plus 76 daily civil operations in the MOAs. The inability of crop duster aerial applicators to know where and at what altitude a training bomber could fly over the area could impact and affect business decisions and economics. Review of assessor procedures and MT, ND, SD, or WY state laws has shown no requirement for disclosure under a MOA. Existing Powder River MOAs not considered relevant by assessors in MT, SD, and WY. No quantifiable property value impacts anticipated. Airspace not expected to impact energy resource development except time-critical deliveries could be delayed. Coordination would be required between mine operators or other blasting operations and the Air Force to ensure that radio frequencies used for mining were not used by Air Force aircraft during training. Potential for aircraft frequencies to result in a triggering of explosives used in mining or construction could have significant impacts. Alternative A noise level changes in PR-1A, PR-1B, PR-3, and PR-4 from a DNL of less than 45 dB to an aircraft calculated <45DNL to 47 dB could be noticeable and be perceived as an impact although noise levels would be below the USEPA-identified DNL of 55 dB which is a noise protective of the public health and welfare. An average of 6 to 9 low-level overflights and approximately one sonic boom during each of 10 days of annual LFEs could impact ranching operations, especially during times when range stock are penned. Within the Powder River A/B MOAs, ranchers have coordinated with the Air Force to identify temporary avoidance areas so that the potential for low-altitude aircraft impact could be reduced. Sonic booms cannot be directed to avoid a location, although the schedule for LFEs would be published in advance. Chaff and flare impacts not expected, although an individual finding a piece of chaff or flare plastic or wrapper residual material could be annoyed. Emergency flight operations such as firefighting and air ambulance would continue under ATC emergency flight procedures. No impact expected. The Air Force would immediately move training activities outside the required airspace to meet emergency needs.

Table 2-36. Summary of Impacts by Resource (Page 10 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
An estimated average of 97 civil aircraft operations could be impacted Monday through Thursday (approximately one-third of that number on Friday morning) as described for Alternative A. Alternative B impacts comparable to Alternative A except that Alternative B does not have airspace below FL180 under the PR-1A, PR-1B, and Gap A ATCAAs. This means no low-altitude overflights over existing or proposed mining operations in the area. Ranching, Tribal, other settlements, and recreational activities in Billings-Miles City-Gillette triangle not overflown below FL180. LFE civil daily impacts to be from 43 to 244 operations above FL180 plus an estimated 57 civil operations in MOAs. Impacts to other areas as described for Alternative A.	Civil aircraft operations impacted by Alternative C estimated at 79 Monday through Thursday (approximately one-third of that number on Friday morning). Alternative C impacts comparable to Alternative A. Alternative C does not have airspace below FL180 under the PR-4 and Gap C ATCAAs. This means that Tribal lands, ranching, recreation, and other activities within this area would not experience low-altitude overflights. LFE civil daily impacts to be from 43 to 244 operations above FL180 plus an estimated 48 civil operations in MOAs. Impacts to other areas as described for Alternative A.	Continue training including low-level overflights in Powder River airspace. Estimated 7 civilian operations to be impacted daily. No change in socioeconomic effects.

Table 2-36. Summary of Impacts by Resource (Page 11 of 14)

Environmental Resource	*Alternative A Preferred Alternative*
Environmental Justice (EIS Section 4.10)	Alternative A minority and low-income population concentrations reside on the entire Northern Cheyenne Reservation and portions of the Crow Reservation under PR-1B. PR-4 MOA on the eastern side of the airspace is not over population concentrations of the Standing Rock Reservation and only overflies a corner of the Cheyenne River Reservation. Tribes have sacred sites for spiritual ceremonies and vision quests under proposed airspace. Sites which are culturally or spiritually significant to Native Americans are located on or near reservations and ceremonies may be conducted by Native Americans at these sites. The potential for adverse impacts at these culturally significant sites would be disproportionate for the Native Americans associated with the four reservations located beneath the proposed PRTC, especially for the Northern Cheyenne and Crow Reservations. During Government-to-Government consultations, the Air Force has sought to identify sacred sites and specific times of the year when temporary avoidance areas could be established to reduce the potential disruption from aircraft noise and visual disturbances. Coordinating flight schedules, establishing altitude restrictions, and identifying avoidance areas could reduce the potential for impacts to tribal lands although disproportionate impacts could occur, particularly to minority and low-income populations under PR-1B. Youth populations in the affected counties are highest on the Crow and Northern Cheyenne Reservations under PR-1B. Reaction to low-level overflight or sonic booms could temporarily disrupt classrooms but would not be expected to have long-term learning or health impact upon children. The primary exception to this is under the proposed PR-1B MOA where the concentration of youth exists. Under the PR-2, PR-3, and PR-4 MOAs, which would be subject to low-level overflights, the affected population is 20,122 persons, of which 558 are minority, 2,932 live below the poverty level, and 5,016 are children, including the affected populations within the Standing Rock and Cheyenne River Reservations. Under the PR-1A and PR-1B MOAs, the affected populations is 16,746 persons, of which 9,717 are minority, 4,734 live below the poverty level, and 6,074 are children, including the affected populations within the Northern Cheyenne and Crow Reservations.

Table 2-36. Summary of Impacts by Resource (Page 12 of 14)

Alternative B	*Alternative C*	*No Action Alternative*
Alternative B would not establish PR-1A/1B MOAs and would not overfly the Crow or Northern Cheyenne Reservations below FL180. Potential would exist to impact the rural areas of the Standing Rock Reservation and a small corner of the Cheyenne River Reservation located beneath proposed PR-4 MOA. There would be the potential for disproportionate adverse impact on the Native American reservations under PR-4. Coordinating flight schedules, establishing altitude restrictions, and identifying avoidance areas could reduce the potential for significant impacts to tribal lands. Effects on youth populations would generally be less than those described for Alternative A.	Alternative C would include PR-1A and PR-1B MOAs and would impact portions of the Crow Reservation and all of the Northern Cheyenne Reservation as described for Alternative A. There would be no low-level overflights of Standing Rock and Cheyenne River Reservations. Potential for disproportionate adverse impact on the Crow and Northern Cheyenne Reservations as described for Alternative A. Coordinating flight schedules, establishing altitude restrictions, and identifying avoidance areas could reduce the potential for impacts to tribal lands although disproportionate impacts, particularly under PR-1B, could be expected. Effects on youth populations would be generally as described for Alternative A with the higher proportion of youth impacted under the proposed PR-1B MOA than under any other proposed airspace.	No Tribal Reservations under existing Powder River airspace. No disproportionate impact upon environmental justice population associated with the existing Powder River airspace.

Table 2-36. Summary of Impacts by Resource (Page 13 of 14)

Environmental Resource	*Cumulative*
Cumulative (EIS Section 5.0)	Cumulative effects analysis considers the potential incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes any such action. Potential cumulative projects in the ROI include plans and permits to develop mineral reserves, including oil, gas, and coal reserves, and transportation of excavated resources. Other cumulative projects include beddown of an additional B-52 squadron at Minot AFB, airspace actions in North Dakota and Utah, and potential addition of threat emitters and simulated targets to add realism to aircrew training. **Airspace, Noise, and Safety** The additional B-52 squadron has been included throughout the EIS as a baseline condition. Cumulative potential effects upon other airspace users or potential users have been included throughout this EIS, including impacts to airspace access and impacts to time-sensitive deliveries as a result of the inability to fly IFR through an active MOA. Approximately 2 to 4 hour delays or re- routing could impact time-sensitive deliveries to existing or proposed mining, transportation projects, industrial development, or agricultural operations. Limited communication and radar coverage which impact safe civil aircraft operations and airports would continue below 12,000 feet MSL in much of the proposed airspace. The B-1 or B-52 would randomly overfly at levels of 2,000 feet AGL or below approximately 2 to 4 percent of each MOA during any training workday. This level of overflight and potential startle effect is not expected to significantly alter or cumulatively affect any development plan or resources within the region. Infrequent sonic booms during LFEs not expected to interfere or cumulatively affect other ongoing or proposed activities. Aircraft training overflight noise is expected to be random and would not cumulatively interact with construction sites. Coordination and communication with mining or other blasting related activities, such as new rail lines, would be required for safety to avoid significant cumulative impacts. No cumulative effects to noise or safety from PRTC would be expected in conjunction with other projects in the ROI. **Physical Resources and Air Quality** Mineral excavation and transportation line construction could potentially impact large amounts of soil and water resources and could contribute to air quality impacts. Separate environmental analyses, prepared for the projects, will document impacts and mitigations. Potential construction of emitter sites would not be expected to have an impact on soils, water, or air quality resource. Any threat emitters on 15-acre sites would be subject to environmental review. Siting criteria would include being near power for electricity to run the threat emitters, so no air quality effects from generators would be anticipated. Aircraft overflights do not produce an amount of emissions which could contribute to cumulative air quality impacts or result in discernible contributions to present or future nonattainment areas. No cumulative effects are anticipated to physical resources or air quality as a result of the proposed PRTC. **Natural and Cultural Resources** Mineral excavation and transportation line construction could impact natural and cultural resources. Construction and other ground-disturbing projects could impact Tribal lands and cultural resources. Separate environmental documentation would assess direct and indirect impacts of these projects. Cultural resources on Tribal lands experiencing construction or other ground-disturbing effects could be impacted directly as a result of other projects in the ROI. Some cumulative effects could occur from infrequent low-level overflights in conjunction with extensive planned mineral operations on Tribal lands. Potential construction of emitter sites would not be expected to have a cumulative impact in conjunction with large scale mining projects based on the relatively small size of the emitter sites and the need for sites to be on an open rise where they could project out as far as possible. Emitters would be located to avoid environmentally sensitive areas and would not be expected to cumulatively contribute to disturbance of natural or cultural resources.

Table 2-36. Summary of Impacts by Resource (Page 14 of 14)

Environmental Resource	*Cumulative*
Cumulative (EIS Section 5.0) (continued)	**Land Use, Socioeconomics, and Environmental Justice** Substantial construction projects in the ROI would alter employment patterns in areas of mineral development or transportation projects. Construction projects and additional large-scale mining would contribute to regional employment while changing the nature of the economy. Agreements regarding construction and operation jobs for Tribal members could improve economic opportunities for minority and low income populations. Temporary avoidance areas would be established over construction sites where tall cranes or helicopters would be used in the construction. Permanent avoidance areas would be mapped for tall structures such as smokestacks or wind generation machines. Cumulative impacts from overflight in conjunction with mining operations would not be anticipated. Low-level overflight and associated hunting and other recreation continue throughout the area overlain by the existing Powder River A/B MOAs. The fact that recreation occurs in areas of current low-level overflights suggests that the actual military aircraft overflight impacts could be less than the uncertainty of an average of 6 to 9 low-level overflights per year. For all environmental resources except civilian air operations and cultural resources where impacts would occur, the establishment of the PRTC in combination with any other ongoing activity by federal or other agencies or enterprises would not be expected to cumulatively impact environmental resources.

2.12 Mitigation Measures

The Air Force would employ the following measures during regular training and LFEs to mitigate impacts:

1. Airspace scheduled times of use are specified in the Air Force's aeronautical proposal, summarized in Tables 2-10 and 2-11, and published online at http://sua.faa.gov/sua/Welcome.do
2. Airspace scheduled outside of normal published times of use is disseminated via Notice to Airmen (NOTAMs), available at https://pilotweb.nas.faa.gov/.
3. Low and High MOAs allow ATC to vector IFR traffic as soon as training is completed in an airspace segment.
4. Airspace use and long term planning information on deconfliction, fire-fighting operations, and special events/cultural events is available during normal business hours 8:00 am-5:00 pm Local, Monday through Friday from the Ellsworth AFB Airspace Management Office at (605) 385-1230.
5. Information posted on flyers and posters can be found at public airports underlying the airspace and is updated annually by the Ellsworth AFB Flight Safety Office as part of the Mid-Air Collision Avoidance Program at (605) 385-4419.
6. The Ellsworth AFB Public Affairs Office is available to answer inquiries and complaints at (605) 385-5056 8:00 am-5:00 pm Monday through Friday. In the event of any damage or injury associated with PRTC operations, descriptive documentation related to the Air Force Claims Program can be sent in to the Ellsworth AFB Public Affairs Office.
7. The Air Force would establish reasonable temporary or seasonal avoidance areas or could adopt other measures identified in consultation with affected tribes to reduce intrusive impacts.
8. The Air Force would extend the current practice of establishing reasonable temporary or seasonal avoidance areas in response to affected ranchers who call Ellsworth AFB Public Affairs Office to identify locations of ranch operations, such as calving, weaning, and branding.
9. Where schedule changes require use of airspace outside of published times of use, the Air Force would inform ARTCCs at least 2 hours in advance in order to facilitate issuance of a NOTAM.
10. Publish a notice at least one month in advance of LFEs to help civil aircraft pilots and the public plan for LFE airspace activation.
11. The Air Force would establish procedures to avoid low altitude overflight of and frequency interference with known blasting operations e.g. associated with coal mining operations.
12. The Air Force would establish communication procedures to ensure the ability to recall the military aircraft from the low altitude MOAs in PR-1A, PR-3, and PR-4 to allow civil IFR departures and arrivals.
13. The Air Force would establish communication procedures to ensure deconfliction with emergency flight operations within the proposed airspace.