

## WEATHER EFFECTS

### **Weather Limitations**

The weather must be considered in developing the collection plan. If any of the following conditions are present, the mission will not launch:

- Ceilings of 6,000 feet or less will prevent collection during mission.
- Winds: Headwind of 35 knots, tailwind of 3 knots, and crosswind of 20 knots.
- Winds aloft of greater than 50 knots.
- Lightning within 10 nautical miles.
- Ice.

Marked seasonal extremes of temperature and scarcity of precipitation characterize Afghanistan's climate. Topographic features strongly influence all elements of the climate. Winters (December through February) are dominated by constantly changing air masses associated with passing migratory lows and frontal systems. Winters are cold, with nighttime temperatures below freezing common in low elevations and frequent winter snows at higher elevations. To the south and southeast the low-level temperatures are less severe. Winter snows are frequent at the higher elevations and there are permanent snowfields in the Hindu Kush. Summers (June through August) are continuously sunny, dry, and severely hot; however, intrusions of moist, southerly monsoon air occasionally bring rain, increased humidity, and cloudiness to the extreme eastern portions. At elevations below 1,220 meters (about 4,000 feet) temperatures rise to over 38°C (100°F) on a daily basis. Very low humidity is normal during the summer. In the other seasons, relative humidity is high in the early morning and moderate in the afternoon over most sections. In most of Afghanistan, winter and spring are the cloudiest periods, and clear skies are common in summer. Precipitation is scarce, with desert conditions prevailing in the southwestern and northern plains. What annual precipitation there is falls mostly in the winter and spring; summers are almost uniformly rainless. Thunderstorms are most frequent during the spring, but also occur during summer in extreme eastern portions of the country. Flash floods sometimes result from severe thundershowers. Long droughts are not uncommon.

**Rotor Blade Erosion.** Helicopter rotor blades were being severely affected by erosion from sand and dust. Brown-outs were a constant hazard. **Engine performance** was degraded due to sand ingestion. Special procedures were developed to minimize sand problems.

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Afghanistan is located in southern Asia and is completely landlocked. It is bordered to the west by Iran, to the south and east by Pakistan, to the north by Turkmenistan, Uzbekistan, and Tajikistan, and to the northeast by China.

Afghanistan is divided into 3 regions

1. Northern Plains – consist of plains and fertile foothills, it is intensively cultivated and densely populated.
2. Central Highlands – Mainly mountains.
3. Southwestern Plateau – consist of high plateaus, sandy deserts and semi-deserts.

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The highest point in the country is Nowshak in the northeast border area at 7,485m.

The majority of the country lies between 2,000 to 10,000 feet.

Two major mountains Hindu Kush and Pamir Mountains

The Hindu Kush Mountains divide Afghanistan into three distinct regions

The Hindu Kush Mountains run from the northeast to the southwest of Afghanistan, and form a barrier between the fertile north and the rest of the country.

Southeast of Kabul lies the Khybar Pass, which leads to the Indian subcontinent, on the Pakistan border.

The Northern Plains region extends eastward from the Iranian border to the foothills of the Pamir Mountains, near the border with Tajikistan.

The Sistan Depression – 1500 – 1700ft

Lying more than 482 kilometers (300 miles) from the sea, Afghanistan is a barren, mostly mountainous country of about 647,500 square kilometers (250,000 square miles). It is bordered by Turkmenistan, Uzbekistan, and Tajikistan to the north, Pakistan to the east and south, and Iran to the west. Including a long, narrow panhandle (the Wakhan Corridor) in the northeast, Afghanistan has a northeast-southwest extent of about 11,450 kilometers (900 miles), and a northwest-southeast extent of about 804 kilometers (500 miles). With peaks up to about 7315 meters (24,000 feet), the Hindu Kush forms the spine of the country, trending southwestward from the Pamir Knot to the central Afghan province of Bamian. Subsidiary ranges continue to the south and the west with decreasing elevations, gradually merging into the plains that continue into Iran and Pakistan. A broad plateau stretches from north of the Hindu Kush to the Amu Darya River and eventually to the Russian steppes. In the east, the mountains are indistinguishable from those of Pakistan.

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The northern plains are actually steppes with seasonal grasslands supporting a small nomadic population. Permanent settlements are located along the margin of the steppes and on the flood plain of the Amu Darya River.

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The mountains that comprise the other two-thirds of the country are the perennially snowcapped Hindu Kush in the northeast and progressively lower mountains in the west. The Hindu Kush have sharp-crested ridges and towering peaks, while the lower, western mountains are generally rounded or flat-topped. Afghanistan can be broken down into three military operational zones: the Northern Steppe, the Afghan Highlands, and the Southwestern Desert Basins.

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About one-third of Afghanistan, in the southwest and north, is arid plain. The southwestern plain is the larger of the two and is a barren desert with large areas of drifting sand, scattered hill belts, and a few low mountains. Small villages along a few intermittent streams, small settlements, and a narrow band of cultivation along the

Helmand River are the only features that break desolation. The Helmand is one of the few perennial streams in the region.

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**Altitude problems.** Terrain definition was extremely difficult, if not impossible, to discern at altitudes above 80 feet AGL due to a lack of terrain definition. At altitudes below 50-80 feet, AGL rises in terrain elevation are difficult to identify causing potential problems with flying into sand dunes. Many pilots used the IR searchlight as an aid to enhance terrain definition.

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**Night-Vision Systems.** Although the night-vision devices/systems enhanced the capabilities of aircrews to fly in the night environment, the ANVIS 6 night-vision goggles (NVGs) proved inadequate for the SWA desert night environment.

- Low moon illumination - With moon illumination levels at 20-30 percent or less, the terrain contrast/definition was inadequate for NVG operations for most units.
- High moon illumination - With moon illumination levels at 85-100 percent, the NVGs had a tendency to "white out;" that is, shut down due to the brightness.
- Moon shadows - With moon angles of 23 to 60 degrees and illumination levels of 30 percent or greater, coupled with the moon positioned to the front or side of the aircraft (approximately 9 o'clock-3 o'clock position), crews could pick up shadows and use the contrast for terrain definition. However, with the moon to the rear quadrants (4 o'clock-8 o'clock position), the moon shadows either could not be picked up or were difficult to see. This caused terrain blending, making it extremely difficult to discern increases/decreases in elevation sloping, small buttes, and hills.

The al-Qaida and Taliban forces that U.S. and coalition forces are fighting in Afghanistan have numerous factors favoring their use of high-altitude operations. The high-altitude Afghanistan region bordering Pakistan resembles the area on the Pakistan and India border where numerous clashes have occurred between Pakistan and India. This includes battles on the Siachin Glacier, which has the distinction of being the world's highest battlefield at 19,000 feet. The Indian and Pakistani armies facing each other on this battlefield have been credited as being the foremost experts of high-altitude warfare for good reason. In operations against each other, their casualties have been high, yet the most significant factor is that 80 percent have been directly related to either cold or high altitude.

High altitude operations increase energy requirements by as much as 50 percent and, coupled with cold temperatures and increased physical activity, have the potential of making soldier missions a secondary thought to surviving. The increase in physical activity may only be offset by thorough acclimatization and conditioning and equipment designed for the conditions, as well as special skills and training. These factors may have a direct impact on how a soldier performs in high-altitude conditions.

- Rugged conditioning.
- Thorough acclimatization.
- Cold weather injuries.
- Sunburn, windburn, and overexertion, creating sweat and wetness, even under cold conditions.
- Calorie intake of up to 6,000 calories per day.
- Confidence in leader's ability to deal with the altitude and conditions.

Acute mountain sickness (AMS) is a sickness that may begin at 8,000 feet above sea level. The symptoms listed below may be linked to a high rate of ascent. Many factors influence who becomes ill and who does not. A modest descent may easily reverse the following symptoms:

- Headache, and possibly some dizziness.
- Sleep disturbance.
- Fatigue.

One illness and a step up from AMS that has the potential for disrupting military operations, and one with life-threatening implications, is hypoxia. Hypoxia is high-altitude sickness in its worst form. It is a condition in which the tissues of the body are starved for oxygen. The body reacts to this loss of oxygen by increased breathing to get more air. The physical activity of the body increases the heart rate. This condition can cloud judgment. Symptoms of hypoxia include dizziness, giddiness, a tingling sensation, euphoria, blurred and/or tunnel vision, lack of muscle coordination, and a demonstrative slow reaction time. The condition affects every soldier differently depending on the soldier's age, general health, physical conditioning, and training. The results of hypoxia can have minimal effect on an individual at 10,000 feet, but will surely increase in effects as that individual increases altitude, with a loss of consciousness and possible death above 35,000 feet. Operations above this level absolutely require an oxygen supply. The distance in altitude between 10,000 feet and 35,000 feet in operational terms is directly related to the effects of hypoxia on the soldier's ability to accomplish the mission without taking into account the other factors of mission, enemy, terrain, troops available, and time available (METT-T).

FM communications can be ineffective in Afghanistan due to the high altitude and operating distances. Companies and battalions are essentially operating from their headquarters. Due to the difficult terrain and modified table of organization and equipment (MTOE) fielding, units often are limited to tactical satellite (TACSAT) radios to communicate over vast distances. Units have only a single channel wide band TACSAT radio available in use. The TACSAT system is slow and requires deliberate conversation. Army bandwidth may be too narrow for effective communications. ! Ground and aviation unit commanders must understand and accept the significance that high altitude and dust have on aviation assets and aviation availability. Aviation unit operations in Afghanistan are primarily taking place at 10,500 feet above sea level (ASL)..

Detailed understanding of power required vs. power available.

Wind/Terrain analysis. \*. Understanding how winds move through and around mountains. This knowledge allows pilots to use the winds to their advantage. With limited power available, a miscalculation of winds may be what results in a mishap.

\* LZ evaluation. What are the power requirements for different LZ types?

\* Ability to accurately predict power required. In a mountainous environment, aircraft can transit significant altitude changes in relatively short distances. Altitudes, temperatures, and weights are continually changing requiring pilots to continually update power requirements.

### **SLIDE 30**

Afghanistan has four major river systems that originate in the Hindu Kush: the Kabul, the Helmand, the Amu Darya, and the Harirud. Of the four, only the eastward flowing Kabul ever reaches the ocean; the other three eventually disappear into salt marshes or desert wastes. Only the Amu Darya (also known as the Oxus) has significant navigable reaches. The rest are fordable for the greater part of the year throughout their courses. The Amu Darya also serves as the northern border of Afghanistan. The Helmand is the largest in flow and volume and runs southward into across the southern desert into the salt marsh wastes found along the Afghan- Iranian border. The Harirud runs westward past Herat then turns northward, forming the border between Afghanistan and Iran. All the Afghan rivers and their tributaries are used for irrigation. Supplementing the stream irrigation is the karez, a system of underground channels (with vertical access and maintenance shafts) carrying water from the base of the mountain slopes to oases on valley floors. The signature of karez (qanat in Iran), particularly noticeable from the air, is the row of evenly spaced openings (shafts) surrounded by mounds of earth that define the course of the underground channels.

### **SLIDE 31**

Practically the entire drainage system of Afghanistan is enclosed within the country. The major drainage systems are those of the Amu Dar'ya, the Hilmand, Kabul, and the HariRoad.

The Amu Dar'ya River forms the frontier between Afghanistan and the republics of Tajikistan and Uzbekistan. It starts in the Pamir Mts in Tajikistan and flows west and empties into the Aral Sea in Uzbekistan. It is the only navigable waterway with port systems consisting of 3 minor inland waterway facilities and river bank operations along the northern border.

The HariRoad River originates on the western slopes of the Central Highlands, at an altitude of 2,800m above sea level. The River flows westward and turns north to run along the border with Iran, and ends in Turkmenistan.

The Hilmand River in the southwest, originates in the Central Highlands, and flows southwest, where it reaches an area of seasonal lakes in the Sistan Depression.

The largest drainage system in the Northeastern region is that of the Kabul River, which flows southeast from the Hindu Kush Mountains to join the Indus River in Pakistan.

There are no significant drainage feature located within Afghanistan with the exception of the Amu Darya in the north which also makes up the border between Afghanistan and Uzbekistan and Tajikistan.

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#### **Roads -**

Route 5 travels from east to west from Mazar-e-Sharif to Herat.

Route 2 travels north from Kabul to Mazar-e-Sharif. There is a major tunnel on this route cutting into the Central Highlands which is 3363m in length.

Route 1 travels south from Herat through Kandahar and Kabul to Jalalabad then into Pakistan.

#### **Railroads –**

There is only 24km of railroad in the country. Afghanistan depends on neighboring countries for support.

#### **Airfields –**

1. Three C-5 capable
2. Two C-17 capable
3. One C-130 capable

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Afghanistan's population, estimated at 26,813,057 (U.S. Census Bureau, 2001) is characterized by high growth, low quality of life, and an unusual settlement pattern brought on by conflict and drought. The country is extremely young, with 42 percent of the population under the age of 15. Life expectancy is under 40 years, reflecting the overwhelmingly poor living conditions throughout the country. The majority of the people (about 60 percent) live in rural areas, about 30 percent live in cities, and 10 percent live a nomadic lifestyle. These percentages are rough estimates, however, because the ongoing civil war and a succession of poor growing seasons have forced over 3 million Afghans to become refugees. Between 600,000 and 800,000 people were internally displaced as of the end of 2000, according to the UN Office for the Coordination of Humanitarian Affairs. The UN High Commissioner for Refugees estimates that 2.5 million Afghans have migrated out of the country.

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**Kandahar.** Kandahar is located in southern Afghanistan, approximately 500 kilometers (310 miles) southwest of Kabul and 90 kilometers (56 miles) northwest of the Pakistan border. The city lies at the northeast corner of the vast, nearly uninhabited Dasht-i Margow. Kandahar is in an area of subtropical steppe. Sand ridges and dunes alternate with expansive desert plains. There are also areas of barren gravel and clay where sparse vegetation and low growth prevail. Kandahar's population is estimated at 329,300 (U.S. Census Bureau, 2001).

**Kabul.** Kabul is located in northeastern Afghanistan on the banks of the Kabul River. The city spreads out on the north and south banks of the river and is further separated into northern and southern sections by a series of low hills. The Kabul River flows from southwest to northeast and through the water gap known as “Lion’s Gate,” which divides the hills. Elevations range from 1,789 meters above sea level at Kabul International Airfield to 2,219 meters at Kohe Sher Peak near the city center. Several small streams flow in from the west, joining to form the Cheltan River, which, in turn, joins the Kabul River just south of the Lion’s Gate. The Logar River flows north to join the Kabul River in eastern Kabul; Khargz Lake, about 20 kilometers west of central Kabul, is the only lake in the region. There are, however, several small marshes scattered across the northeastern half of the city and environs. Soils on the mostly flat plains around Kabul are deep silty sand, clayey sand, and gravels that are fair to good in over-all suitability for construction purposes. On hill slopes, bedrock outcrops comprise half or more of the surfaces.

**Jalalabad.** Jalalabad is the largest urban center in eastern Afghanistan between Kabul (125 kilometers [78 miles] to the west) and the Pakistan border at the Khyber Pass (75 kilometers [47 miles] to the east). The city has been an important commercial, telecommunications, and cultural center, and has a population of 154,200 (U.S. Census Bureau, 2001). The city dominates the entrances to the Laghman and Kunar valleys and is a leading trading center with India and Pakistan. Oranges, rice, and sugarcane grow in the fertile surrounding area, and the city has cane processing and sugar refining as well as papermaking industries.

**Mazar-e Sharif.** Mazar-e Sharif, the provincial capital of the Balkh Province, is situated on the main route between Kabul and the Termiz, Uzbekistan. Historically, its importance was twofold: it was 70 kilometers (43 miles) south of the Soviet Union, and it was a center for Afghanistan’s fledgling oil industry. Its population is estimated at 232,800 (U.S. Census Bureau, 2001).

**Herat.** Herat is centered in western Afghanistan on the flat river plains a few kilometers north of the Harirod River. The Iran border is approximately 120 kilometers (75 miles) to the west, Turkmenistan 110 kilometers (68 miles) to the north, and Kabul is approximately 650 kilometers (400 miles) to the east. Elevations within the city range from roughly 920 meters (3,018 feet) ASL in the south to 960 meters (3,150 feet) ASL in the north. Mountains ranging in height from 1,800 meters to 3,300 meters (about 6,000 to 11,000 feet) surround the city. Earthquakes and tremors are common occurrences. Herat experiences a hot, north-northwesterly wind from May to September. This wind blows constantly, but is particularly strong in the afternoon; wind velocity is typically around 50 miles per hour (43.5 knots), with gusts up to 80 miles per hour (69.5 knots).

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Afghanistan is a complex mosaic of ethnolinguistic groups. The dominant group,

politically and in terms of numbers, has been the Pashtun, who consider themselves the “true” Afghani people. Pashtuns are Sunni Moslems, tribally organized, speak Pashtun, and comprise between 35 and 50 percent of the population. The Pashtun live primarily in the south and east areas of Afghanistan, which include the cities of Kandahar and Kabul, respectively. Throughout Afghanistan’s history, tribal rivalries have characterized the Pashtun people, but tribes have tended to put aside such differences when faced by a common enemy, such as the British in the 19th century and the Soviets in 1979. The Tajiks are the principal ethnic group of Afghanistan’s northeast. Tajiks comprise about 25 to 30 percent of the population and are defined as Sunni Moslems who speak Dari, a derivative of Farsi. Animosity between the Tajiks and Pashtuns has been a hallmark of internal politics since the British were driven out in the 19th century. The Hazaras, who make up about 15 percent of the population, are concentrated primarily in the center of the country. Hazaras are characterized by Mongoloid features and practice the Shia variety of Islam. Historically, the lowest group on the Afghan social ladder, the Hazaras have endured discrimination and poor living conditions for centuries. Most are engaged in agricultural activities. The final large ethnic group in Afghanistan are the Uzbeks, whose numbers have diminished in recent years as many have migrated to Uzbekistan. Located primarily in the northcentral section of the country, the Uzbeks speak Uzbeki and comprise about 10 percent of the national population.

## **Environmental Issues**

### **Current Environmental Issues**

The war in Afghanistan has incurred severe physical and socioeconomic effects, which have,

in turn, aggravated its existing environmental problems. Of these problems, the most acute

include the following:

- ☐ deforestation -- due to the demand for fuel for heating in harsh winters
- ☐ desertification
- ☐ soil degradation and erosion
- ☐ water pollution due to contamination from unsanitary living conditions
- ☐ water scarcity as a result of decimated irrigation systems
- ☐ contamination of food sources -- as a consequence of the use of banned agro-chemicals

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What little natural vegetation there is in Afghanistan consists mainly of bunch grasses; trees are scarce and mostly limited to planted poplars and willows around settlements. Because of infertile soils and centuries of seeking fuel and forage, even scrub and brush are difficult to find. Timber is mostly absent. Any timber laying around the ground or attached to buildings in deserted villages should be suspect for booby traps. Timber is very scarce and villagers will booby trap their homes to prevent theft and pilferage. Irrigated areas produce wheat, barley, corn, and rice, as well as sugar beets, melons, grapes, cotton almonds, and deciduous fruits. The two primary Afghan cash crops are



opium poppy and cannabis. Afghanistan is the major opium supplier for the European heroin market.

## **CONCLUSION**

Afghanistan is one of the world's poorest and least developed countries. The geographical location of Afghanistan contributes to many of its features: abundance of natural resources such as natural gas, petroleum, coal, copper, and precious and semiprecious stones; varied but landlocked topography with mostly rugged mountains, especially in the northeast, and plains in the north and southwest; earthquakes and flooding; ethnic diversity; and a variety of languages. The Taliban, preoccupied by its determination to defeat the Northern Alliance, did little to rebuild Afghanistan, which has been in economic disarray since the end of Soviet occupation in 1989. Two decades of war and grinding poverty have left Afghanistan in disrepair: Warfare has destroyed roads, bridges, and canals, while looting and shortages of spare parts has shut down power plants, factories, and telephone systems. Afghanistan has some of the worst social indicators in the world: the highest rates of illiteracy; mother, child, and infant mortality; malnutrition; and ratio of widows and orphans in the population. These combine to produce one of the lowest life expectancies on the globe. The bleak situation has prompted foreign aid efforts, such as the UN World Food Program, which provides assistance during periods of drought.