

An hourglass-shaped graphic with a globe inside. The top bulb is dark grey, and the bottom bulb is light blue. The globe is light blue with dark blue outlines of continents. The hourglass is centered on the page.

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*Operation Enduring Freedom: Potential Air Power
Questions for Congress*

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Abstract. As the United States prepares for possible military conflict in Afghanistan, it is considering employing military air power in a variety of roles. Congress may have questions concerning the effective use of air power, including which aircraft are likely to be involved and how will they be used. Other questions include what risks U.S. aircraft may face, potential readiness or sustainment issues, logistical challenges, and the effectiveness of U.S. air forces against a "low tech" enemy.

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Operation Enduring Freedom: Potential Air Power Questions for Congress

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Summary

The United States is employing military air power in a variety of roles in the Afghan conflict. Congress may have questions concerning the effective use of air power, including which aircraft are likely to be involved and how they are used. Other questions include what risks U.S. aircraft may face, potential readiness issues, logistical challenges, and the effectiveness of U.S. air forces against a “low-tech” enemy.

Introduction¹

In light of the September 11, 2001 terrorist attacks on the World Trade Center and the Pentagon, the Bush administration has announced a new war on terrorism. Although the administration’s objectives are to counter terrorism globally, considerable attention will likely be focused on Osama bin Laden, his Al Qaeda terrorist network, and the Taliban government of Afghanistan, which aids and supports bin Laden. The Administration has stated it will employ a wide variety of tools against the terrorist threat, including diplomatic, economic, and military actions. This report will address the key issues associated with employing air power in support of Operation Enduring Freedom, the evolving military action against bin Laden and his supporters.

Potential Questions for Congress

Which aircraft are likely to be involved in Operation Enduring Freedom and how will they be used?

Operation Enduring Freedom may require Air Force, Navy, Marine Corps and Army aviation assets for intelligence, surveillance and reconnaissance flights, suppression of

¹ For more information on Operation Enduring Freedom, see the CRS Electronic Briefing Book, *Terrorism*, page on “Military Responses” at [<http://www.congress.gov/brbk/html/ebter80.html>].

enemy air defenses, ground attack, close air support, and air mobility missions including lift, and aerial refueling.

Intelligence, Surveillance, and Reconnaissance (ISR). Acquiring actionable intelligence regarding bin Laden and his supporter's whereabouts is a high priority regardless of what specific military action is contemplated. Navy EP-3 and USAF RC-135 aircraft may be useful if the terrorists employ electronic communications. The U-2, JSTARS, and unmanned aerial vehicles (UAVs) such as Predator and prototypes of Global Hawk have been deployed to conduct radar and electro optical surveillance and reconnaissance of Afghanistan, in an attempt to find, identify, track, and engage bin Laden, his colleagues, or his resources.

Ground Attack. A variety of theater-range aircraft could be employed to strike at bin Laden and his associates, including the U.S. Navy F-14 Tomcat, F/A-18 Hornet, Marine Corps AV-8B Harrier, and Air Force F-15 Eagle, F-16 Falcon, and F117 Nighthawk aircraft. A-10 aircraft have proved effective against many ground targets, and in prosecuting close air support missions. The long loiter time and high firepower of the AC-130 gun ship has proved it a valuable resource. Army attack helicopters such as the AH-64 Apache may also be employed in the ground attack role. In-theater basing and force protection are issues that must be addressed to effectively employ these aircraft. Armed versions of the Predator UAV have also been employed. Long-range bombers such as the B-2, B-52 and B-1 have been employed, from bases in the United States, and from other locations such as the base at Diego Garcia. Their range reduces the requirement to base these aircraft near Afghanistan, although proximate basing can increase combat sortie rates.

Suppression of Enemy Air Defenses (SEAD). Despite Afghanistan's comparatively weak air defenses, U.S. aircraft designed to suppress or destroy SAMs and AAA guns – such as EA-6B, EC-130H, and F-16CJ – will likely be used to ensure U.S. aircraft have the maximum freedom of operation. Electronic, and especially infrared countermeasures on all aircraft are important in ensuring aircraft survivability against man portable SAMs, which SEAD aircraft may have difficulty suppressing.

Air Mobility. Aerial Refueling: KC-135, KC-10, and Navy refueling aircraft have been deployed to theater and used to both facilitate the deployment and employment of the aircraft described above. C-5, C-17, and C-141 strategic transports will likely be used to airlift personnel and material associated with both air and ground combat. Because of its ability to operate from primitive runways, the C-17 may play an important role. C-130 aircraft may be used for intra-theater lift. Special Operations Forces employ specially designed MH-53J and HH-60G helicopters for infiltration and extraction.

What risks will U.S. aircraft face?

Any air operations in and around Afghanistan will have to consider the possible use of the Taliban's air defenses. The Taliban's estimated air defense order of battle is summarized in the table below. The Taliban's combat aircraft appear to offer little challenge to U.S. air superiority in and around Afghanistan's air space. Their combat aircraft are few, and less capable than currently fielded US combat aircraft. The Taliban's combat aircraft also suffer from a lack of many important factors that contribute to combat effectiveness, such as aerial refueling, airborne warning and control aircraft,

electronic warfare capabilities, digital communications, and stealth technology. It appears that as of early October 2001, these threats had been effectively negated by U.S. air strikes.

October 2001 Estimated Taliban Air Defense Assets

	Type	Number	Comments
Aircraft	MiG-21	10	1 st flight 1955
	Su-22	10	1 st flight 1969
	L-39	5	2-seat trainer aircraft
Surface to Air Missiles	SA-2	57	>70,000 ft altitude
	SA-3	55	60,000 ft altitude
	Stinger	50-100	11,000 ft altitude
	SA-7	unknown	7,500 ft altitude
	SA-13	unknown	16,000 ft altitude
	SA-14	unknown	10,000 ft altitude
Air Defense Artillery	ZU/ZSU-23 (23mm)	100-150 total	8,200 ft range
	M-1939 (37mm)		
	S-60 (57mm)		13,000 ft altitude
	KS-12 (85mm)		25,000 ft altitude
	KS-19 (100mm)		44,000 ft altitude

Source: The Military Balance (MB), International Institute of Strategic Studies 2001. London. MB breaks out Taliban aircraft inventory. SAMs and AAA guns inventory is for Afghanistan with no breakout among political factions. CRS regional experts estimate that at the start of the conflict, the Taliban controlled 50% of Afghanistan's military infrastructure. Therefore this chart depicts 50% of MB total estimates of 115 SA-2s, 110 SA-3's, and 100-300 AAA guns in Afghanistan, and a Washington Post estimate ("Land Mines, Aging Missile Pose Threat" September 25, 2001, p.15.) that "100-200 Stingers remain in Afghanistan."

It appears that any Taliban challenge to U.S. air superiority will be posed by surface-to-air missiles (SAMs) and anti-aircraft artillery (AAA). The most threatening SAMs in terms of range and altitude are the SA-2 and SA-3, which can reach altitudes of approximately 70,000 ft and 60,000 ft respectively. Although these SAMs were designed in the late 1950s and deployed in the 1960s, they remain a cause for concern today. While the radars and command and control assets for these systems are mobile, their missile launchers are semi-fixed and can only be relocated with time and effort. This lack of mobility may be their greatest vulnerability. The United States has demonstrated a very good ability to destroy fixed targets in past conflicts. The 100mm KS-19 AAA gun also can reach high altitudes, but according to one source, its effectiveness "against modern aircraft is very limited."² It appears that as of early October 2001, these threats had been effectively negated by U.S. air strikes.

The remainder of the Taliban's AAA guns and SAMs reach lower altitudes. The M-1939, S-60, and KS-12 are towed guns, which limits their mobility, and thus their survivability. The United States has demonstrated some difficulty in destroying moving and relocatable targets in recent conflicts. The ZSU-23 gun and the SA-13 SAM launcher

² Jane's Land-Based Air Defense 1997-98.

are based on tracked vehicles, which makes them more mobile. The man portable SA-7, SA-14 and Stinger missiles are the most mobile systems and likely the most difficult to target and destroy. In recent conflict, U.S. combat aircraft have mitigated these types of threats by flying at high altitudes.

As two points of comparison, the Taliban's air defense capabilities appear to be notably inferior to those of Iraq and Serbia, both in terms of technology and inventory. In conflicts with these countries (1991 Operation Desert Storm against Iraq, and 1999 Operation Allied Force in Kosovo) the United States lost only 35 aircraft despite flying 89,261 combat sorties. However, in their war with Afghanistan, the Soviet Union lost 333 helicopters and 118 combat aircraft.³ This suggests that the Taliban's air defense capabilities should not be underestimated, and that U.S. aircraft could be lost.

Are there potential readiness or sustainment issues?

It is not clear that U.S. air forces has adequate supply of precision guided munitions for an extended air campaign. Some observers have suggested that DoD has underfunded several munitions programs and may now have to play "catch up."

Inventory of the Joint Direct Attack Munition (JDAM) is one potential area of concern. Popular because of its low cost (approximately \$15,000 per unit), the JDAM was used extensively in Operation Allied Force and stocks were depleted severely. It was reported, for example, that B-2s operating from bases in the United States dropped 600 JDAMs on Serbia. In an annual report to Congress on industrial preparedness, DoD reported industry was stretched thin, and would have difficulties surging JDAM production.⁴ This inability to surge could constrain military options.

Another potential question is the adequacy of the GBU-28 inventory. This munition was developed specifically to attack hardened underground targets. Current inventory of this "bunker buster" is approximately 500 bombs.⁵ Bin Laden's continued use of underground caves and tunnels makes this munition useful, and the inventory could be quickly depleted.

What are the logistical challenges?

If the United States is to successfully prosecute any military action in Afghanistan, it will require air bases in or around Afghanistan from which to operate. The exact number, location and types of bases required will be determined in part by the exact military operation or operations to be conducted. Additionally, overflight rights from Pakistan (granted in early October 2001) and other neighboring countries are important even if basing is not used. Overflight rights would enable U.S. and coalition refueling and

³ Lester Grau (Ed.) *The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan*. (Frank Cass Publishers. London, 1998) p. xix.

⁴ Sharon Weinberger. "Report: Air Force Could Face Choke Point in Precision Guided Weapon Production." *Aerospace Daily*. September 18, 2001.

⁵ Air Force Magazine. May 2001. p.154.

surveillance aircraft to establish orbits near Afghanistan from where they could conduct their missions and increase the range and on-station time of combat and ISR aircraft.

Factors that contribute to the operational attractiveness of an airfield include runway length, runway surface, runway and taxiway weight bearing capacity, and other air base infrastructure such as offloading equipment, hangars, and refueling resources. The air base's distance from likely targets or areas of operation, and air base security are also important considerations. In general terms, airbases with runways in excess of 8,000 feet (2,400 meters) are most attractive to military planners. Although combat aircraft can use runways half that length, the exact combat load, airfield elevation, and potential obstacles near the runway combine to make 8,000 feet a minimum prudent planning factor.⁶

Although there are differences between the Persian Gulf region and Central Asia, making observations about air basing and operations in Operation Desert Storm may offer insight into basing for Operation Enduring Freedom. During Operation Desert Storm, the U.S. Navy positioned four aircraft carriers (USS Ranger, Midway, America, Roosevelt) approximately 300 nautical miles (nm) from the Iraqi border in the Persian Gulf. They positioned two aircraft carriers in the Red Sea (USS Saratoga, Kennedy) approximately 550 nm from the Iraqi border. To facilitate combat and reconnaissance sorties from these positions, the Navy flew aerial refueling aircraft in three general areas: the northern Persian Gulf (southeast of Kuwait and northeast of Dahrhan), northern Saudi Arabia, (just south of Tabuk), and the northern Red Sea.

During Operation Desert Storm, the U.S. Air Force operated its aircraft from more than 20 different airfields in Saudi Arabia, Qatar, UAE, and Oman. Seven of these airfields were between 300 nm and 320 nm from the Iraqi border. Seven airfields were between 450 nm and 600 nm from Iraq, and six airfields were 665 nm to 950 nm from Iraq. The Air Force established four tanker "tracks" above north central Saudi Arabia to refuel aircraft attacking and returning from attacks in Iraq.⁷

There are 55 airfields with runways in excess of 8,000 feet in countries neighboring Afghanistan.⁸ Afghanistan itself has seven airfields with runways in excess of 8,000 feet., and it may be that U.S. and coalition air forces may gain access to one or more of these bases. Other information about these airfields is not readily available.

The southern border of Afghanistan is approximately 200nm from the Arabian Sea, while Kabul is approximately 675nm from the sea. Aircraft carriers operating from the Arabian Sea would likely standoff 100nm from the shore for self protection purposes, which would make the operational distances 300nm and 775nm from the sea respectively. While Navy aerial refueling aircraft can greatly extend the range of combat aircraft,

⁶ Shorter runways can be used for many useful contingencies, such as emergency landing. Large aircraft such as cargo, tanker, and surveillance aircraft also require, in general terms, 8,000 foot runways. Source: Conversation with USAF Legislative Liaison, September, 19, 2001.

⁷ Gulf War Air Power Survey, Vol 2., Washington, DC 1993. p100-103.

⁸ Pakistan has 33 airfields, Tajikistan 6, Turkmenistan 13, and Uzbekistan 3. CIA World Fact Book 2000.

greater distances tend to reduce combat sortie rates. Cruise missile capable ships and submarines could operate from the Arabian Sea and still target all of Afghanistan.

Access to sea ports could also be an important factor for airpower in Operation Enduring Freedom, depending on the specific missions pursued. Many important airpower resources, such as ammunition and fuel are most effectively transported by sea. The ease or difficulty with which Operation Enduring Freedom overcomes basing and logistical challenges may have implications for future funding of air mobility programs like the C-17 and C-5 aircraft, as well as sea lift and pre-positioning assets.

*How applicable are U.S. Air Forces against a “low-tech” enemy and what are the implications for future investments?*⁹

In many ways, it appears that the principal efforts of the U.S. air forces to improve their capabilities do not match up well with the military challenge in Afghanistan. As part of its transformation efforts, for example, the Air Force is emphasizing technologies such as stealth aircraft and precision guided munitions (PGMs). Stealth technology, while always beneficial, is not needed to protect U.S. aircraft from Taliban air defenses, and PGMs are of limited value if targets can not be found or identified. Similarly, one of the Air Force’s leading transformational concepts of operations – Global Strike Task Force – which is designed to obviate anti-access threats, appears to be of marginal importance in Afghanistan where U.S. air forces are likely to operate with minimal challenges.

On the other hand, it appears that U.S. air forces have also invested in technologies that could prove valuable in Afghanistan. The expendability of UAVs, and in some cases their long on-station time, could make them very useful in providing persistent surveillance over the battlespace. Also, the Air Force’s primary organizational innovation, the Air Expeditionary Force (AEF), may help alleviate personnel tempo challenges caused by a prolonged military campaign.

Perhaps the greatest test of the Air Force’s relevance in conflicts like the one unfolding in Afghanistan will be the success of another transformational concept of operation, called Effects Based Operations (EBO). According to Gen. Michael Ryan, EBO includes “our ability to analyze the battle space and to go to the critical points in the battle space to get the effects that we want – through kinetic destruction, or disruption, or deception, or information operations or, probably a combination of all of them.”¹⁰ The considerable analytical capabilities suggested by EBO may be required to find, identify, track, and “effect” elusive adversaries such as bin Laden. Whether EBO is up to this task remains to be seen.

The outcome of Operation Enduring Freedom will likely affect future air force debates. The applicability of many of the more “high tech” programs to the war on terrorism may suggest whether current priorities are best suited to successful conduct of the full range of future military challenges.

⁹ For a more detailed discussion of the transformation issues high lighted in this section, see CRS Report RS20859, *Air Force Transformation: Background and Issues for Congress*.

¹⁰ John Roos. Effects-Based Operations. *Armed Forces Journal International*. March 2001.