



[ANNEX 3-17 AIR MOBILITY OPERATIONS](#)

AIR REFUELING EFFECTS

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Air refueling (AR) is the passing of fuel from an airborne tanker aircraft to a receiver aircraft. It is an integral part of air mobility and brings added capability to combat, combat support, and air mobility for all airpower operations. AR enhances the unique qualities of airpower across the [range of military operations](#). It is equally applicable to all stages of a contingency: deployment, employment, sustainment, and redeployment; as well as to ongoing, steady-state operations. It serves as a force enabler to operations and multiplies the effects of operations at the tactical, operational, and strategic levels of war. It allows air assets to rapidly reach any location around the world with less dependence on forward staging bases. Furthermore, AR significantly expands the force options available to a commander by increasing the range, payload, persistence, and flexibility of other aircraft performing missions like [combat air patrol](#) or [intelligence, surveillance, and reconnaissance](#) operations. The ability of AR to extend the range of aircraft and airborne forces and provide presence and persistence occurs through its force enabling, force multiplier, and force extension capabilities. These provide the joint force commander the ability to maneuver and mass forces at a time and location where the enemy is least prepared, to deter, dissuade, or destroy.

Operations ODYSSEY DAWN and UNIFIED PROTECTOR

During March 2011, Moammar Ghadafi's regime began firing on Libyan civilians in an attempt to quell civil unrest. On March 19th, coalition forces began enforcing U.N. Security Council Resolution 1973 to protect civilians and civilian populated areas under threat of attack. In preparation for kinetic strikes, the US quickly deployed several KC-135 tankers to Moron Air Base, Spain. Air refueling enabled coalition fighter aircraft to use distant bases that otherwise would not have been within range of the targets. Highlighting the tanker force projection and force enabling concept, three B-2 bombers flew from Whiteman Air Force Base, each refueling four times, enabling them to destroy hardened shelters used by Libyan fighter-bombers. Throughout "Operation ODYSSEY DAWN", tanker crews routinely flew 10-hour missions extending the on-station time of coalition fighters.

AR is a force enabler permitting aircraft to remain airborne beyond their unrefueled ranges. It is a crucial part of global strike and global mobility operations. Positioning forces outside the enemy's reach permits a greater portion of combat assets to concentrate on offensive rather than defensive action, thereby enhancing initiative, force protection, and economy of force. It is also a force multiplier permitting receivers to maximize payload without jeopardizing endurance.

Force extension is the AR of one tanker by another. Consolidating fuel from one tanker to another effectively increases flexibility and reduces the number of airborne tankers required while maximizing offload capability. This capability can also be used whenever the fuel requirements of an escorting tanker and its receivers exceed the tanker's takeoff fuel capacity. Since the takeoff fuel load decreases as the amount of payload carried increases, tankers operating "dual role" as airlifter and tanker (transporting a combination of passengers and cargo while performing AR) may require force extension. A number of tanker aircraft are equipped as receivers and can be force extended. Force extension provides the benefit of extending the deployment range of receiver packages by ensuring the supporting tankers do not have to make en route fuel stops.

Although other Services and nations maintain some organic capability, mobility air forces possess the overwhelming preponderance of common-user tanker assets. These assets are capable of refueling most Air Force, Navy, Marine, and coalition aircraft and can accommodate many foreign aircraft.
