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What Is a No-Fly Zone (NFZ)?

A "No-Fly Zone" (NFZ) is a military operation to ensure that no aircraft operate in the airspace of a defined geographic area. An NFZ could also suppress and/or destroy air defenses in a defined region. Many defense analysts consider maintaining NFZs to be combat operations, likely involving actively shooting down and/or destroying a hostile country's aircraft, therefore requiring rules of engagement detailing how and when forces can engage a violating aircraft. NFZs are generally international operations, and U.S. participation in them entails oversight and funding considerations by Congress.

The United States has participated in four declared NFZ operations:

- Operation Deny Flight, from 1993 to 1995, over Bosnia and Herzegovina;
- Operation Northern Watch, from 1991 to 2003, over the 36th Parallel over Iraq;
- Operation Southern Watch, from 1992 to 2003, over the 32nd Parallel (later extended to the 33rd Parallel) over Iraq; and
- Operation Odyssey Dawn, in 2011, over Libya.

What Is Required for an NFZ?

To establish an NFZ, military forces need to commit to enforcing the NFZ and potentially engaging in combat against violators. Military planners generally assume that the airspace in an NFZ would be militarily contested, at least initially, and that friendly forces may need to establish air superiority before enforcing an NFZ. Maintaining an NFZ, therefore, requires a significant amount of military combat forces, usually aircraft. Ground-based air defense assets might also be used to implement an NFZ, either on their own or in conjunction with aircraft. Ground-based air defense assets have tactical limitations, due in part to their range as well as their ability to engage relatively fewer adversary aircraft over the area designated as an NFZ. However, ground-based air defense systems can be less resource-intensive than maintaining air patrols in an air-enforced NFZ.

For any NFZ involving aircraft, a military needs to deploy and maintain a sufficient number of combat fighters to maintain control of the airspace. A military conducting the NFZ would most likely arm fighter aircraft with air-to-air missiles in order to engage any aircraft violating the NFZ airspace. Due to the relatively short ranges of fighter aircraft, aerial refueling aircraft like the KC-135 Stratotanker, the KC-10 Extender, and the KC-46 Pegasus would likely fly within contested airspace to provide additional fuel, increasing fighter range and endurance. Air planners consider these strategically important aircraft relatively defenseless. This means they would require fighter escorts, thereby increasing the overall quantity of fighter aircraft.

In order to coordinate a large and complex operation, the NFZ may require battle management aircraft such as the E-3 Airborne Warning and Control System (AWACS). The E-3 is a strategically important aircraft that also has minimal defenses. To fly in contested airspace (which would allow it to provide the full range of capabilities of its radar), it would also likely need fighter escorts. Alternatively, AWACS could operate further away. While this would make defending AWACS aircraft easier, this would mean that they would not be able to provide as comprehensive radar coverage as they might if they operated within contested airspace.

Suppression of Enemy Air Defense (SEAD) missions in an NFZ would likely require additional combat aircraft. First, electronic attack aircraft like the EA-18 Growler and the EC-130 Compass Call would need to provide electronic warfare capabilities to interfere or "jam" active radar signals. These aircraft could also identify radar and surface-to-air missile locations. Should air defenses become active, EA-18 Growlers and F-16CMs could launch Advanced Antiradiation Guided Missiles to destroy active radars, thus preventing missiles from receiving targeting data.

In addition, the military would plan for combat search and rescue (CSAR) personnel and assets to potentially recover U.S. or allied pilots shot down or crashing due to mechanical failure while enforcing the NFZ. Such assets were utilized in the Balkans when an F-117 and an F-16 were shot down by Serbian air defenses.

Unmanned aircraft might be able to provide support in an NFZ. Such unmanned aircraft (e.g., RQ-4 Global Hawk, MQ-9 Reaper, and the MQ-1C Gray Eagle) could detect potential violating aircraft or air defenses, as well as support SEAD and electronic warfare missions. Unmanned aircraft could also be used as decoys to potentially "bait" an adversary to attack and expend limited resources, as when the U.S. Air Force used MQ-1 Predators in Operations Northern and Southern Watch.

Military Planning Considerations

Planning for an NFZ includes consideration of adversary air defenses, quantity and quality of adversary aircraft, geography, availability of friendly assets, adversary strategy and tactics, and rules of engagement.

Air Defenses. The sophistication of air defenses varies widely around the world, from individual, poorly coordinated anti-aircraft guns to integrated air defense networks coupled with high-performance surface-to-air

missile systems and modern fighter aircraft. The characteristics of a given air defense system will indicate whether establishing an NFZ requires that the defenses be destroyed, suppressed (by jamming, network attack, or other means), or merely bypassed. It will also dictate in part the tactics required for the initial suppression of enemy air defenses; for example, whether it can best be done by manned aircraft, standoff weapons such as cruise missiles, and/or unmanned aircraft.

Adversary Aircraft. The size of the adversary air component to be suppressed—not only the number of aircraft, but also bases—also informs the capabilities that the U.S. and partner forces would have to bring to bear. The quality of the air assets—particularly the quality and training of fighter forces, and the effectiveness of their command and control system—affects the defensive assets that would have to be included in the NFZ force package, as well as the balance of efforts dedicated to offensive action against the enemy, and to defensive action to enhance the survival of "friendly" forces.

Geography. The geographical boundaries of an NFZ help define both the relevant assets and the level of SEAD required. For example, an NFZ focused on coastal areas could allow "friendly" naval air assets to engage more readily, and may not require the same level of SEAD as an NFZ that requires tactical aircraft (and especially supporting assets like tankers) to penetrate deeply into the defended airspace. Similarly, an NFZ that denies flight only over major urban areas, for example, reduces the resource requirements for the NFZ compared to denial of air activity over a whole country, as in Bosnia and Herzegovina, or major areas of a country, as in northern and southern Iraq. The proximity of allied and partner states can affect the availability of basing for land-based tactical aircraft and UAVs—the negotiation of new agreements regarding basing, access, and overflight, if required, can take time. The proximity of oceans, in turn, can provide navigable waters for carrier-based aircraft and/or cruise missile-equipped ships.

Availability of Assets. Plans for resourcing an NFZ may be shaped by concurrent or potential competing demands, in particular for "high-demand, low-density" assets such as intelligence, surveillance, and reconnaissance (ISR). The participation of allies and partners can reduce the demands on U.S. forces for some capabilities. Depending on the scenario, though, the capabilities of partners in areas such as surveillance, and command and control, may not be sufficiently robust to provide equivalent effectiveness.

Adversary Strategy. Strategists generally argue that an understanding of the adversary's strategy and likely tactics should help inform the operational-level objectives of an NFZ operation. That understanding may be based in part on precedent; for example, the Iraqi government's use of chemical weapons against its own northern Kurdish population in 1988, and its use of fixed-wing and rotary-wing aircraft to strafe the population in southern Iraq after the Gulf War. That understanding may also be informed by current intelligence based on input from a variety of possible platforms and assets. If the adversary uses a large fixed-wing transport fleet to move troops around the country, or if it has a large concentration of fighter aircraft near a border with an ally or partner in the region and a track record of some hostility with that state, these factors may shape the priorities of the NFZ operations. Adversary artillery could also affect military planning. Artillery shells and rockets fly at relatively high altitudes, requiring aircraft to either avoid certain areas to prevent an accidental impact, or to fly at higher altitudes and therefore potentially minimize their effective presence.

Rules of Engagement. Those imposing an NFZ operation may choose to limit it formally in scope, in the area of operation, in allowable weapons and tactics, or in other ways, in order to avoid civilian casualties or other losses, to incentivize defections by adversary forces, to restrict actions likely to alienate partners, or for other strategic considerations.

Potential Considerations for Congress

Historically, NFZs have required supplemental funding. Adjusting for inflation, on average from FY1993 through FY2003 the Department of Defense (DOD) requested $1.1 billion in FY2022 dollars for both Northern Watch and Southern Watch. Similarly, in FY2001, DOD requested approximately $2.8 billion supplemental funding in inflation adjusted dollars for operations over the Balkans.

In addition, NFZs reportedly have expended large amounts of munitions. According to defense analysts Mike Pietrucha and Mike Benitez, U.S. and coalition aircraft expended 743 high-speed anti-radiation missiles and nearly 1,500 towed decoys to eliminate the threat of Serbian air defenses during Operation Allied Force. In FY2022, DOD requested funding for 54 Advanced Anti-Radiation Guided Missiles, the successor to the high-speed anti-radiation missile. Assuming a similar missile procurement rate, replacing these expended munitions would take nearly 14 years.

CRS Products

CRS In Focus IF10546, *Defense Primer: United States Airpower*, by Jeremiah Gertler

CRS Report R45996, *Precision-Guided Munitions: Background and Issues for Congress*, by John R. Hoehn

CRS Report R46463, *U.S. Army Short-Range Air Defense Force Structure and Selected Programs: Background and Issues for Congress*, by Andrew Feickert

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