Chapter 7. Forward Arming and Refueling Point Operations

The FARP mission is to provide fuel and ordnance necessary for highly mobile and flexible helicopter and fixed-wing operations. The size of the FARP varies with the mission and the number of aircraft to be serviced. Normally, FARPs are temporary, transitory facilities established for a specific duration and mission. The scope of flight operations in the FARP area should include, but are not limited to, individual aircraft, sections, or divisions of aircraft requiring ordnance and refueling.

The objective of a FARP is to minimize response time and decrease turnaround time in support of sustained operations. Minimizing flight time to and from the FARP and reducing the refueling and rearming time within the FARP achieves this objective. Fueling and arming of assault support aircraft can be accomplished in about 20 to 30 minutes, while processing an attack aircraft may take up to 45 to 50 minutes. In both instances, fueling takes 10 to 15 minutes and ordnance uploading takes up the rest of the time. The overriding factor in estimating FARP processing time revolves around the ordnance requirements. The processing times depend on environmental factors, aircraft armament, and support personnel proficiency.

FARP operations should be considered aviation operations, while FARP planning, coordination, and execution are logistic responsibilities of the requesting unit. FARPs are not exclusive AGS operations, because the following ACE organizations can participate in the execution of a FARP:

1. MWCS communications personnel, MMT, and LAAD.
2. MALS maintenance and ordnance personnel.
3. MAG or squadron assets.
Because of the extensive ACE involvement in FARP operations, an aviator is typically selected to fill the FARP OIC position. The knowledge and experience in logistics, aircraft refueling, and security resident in the MWSS make it the ideal source for providing the second in command of the FARP.

The FARP OIC deconflicts and interacts with the various agencies outside of the FARP (e.g., TACC, direct air support center [DASC], LAAD, pilots), while the senior MWSS representative manages and supervises the activities internal to the FARP. Refer to appendix A and NAVAIR 00-80T-109 for details regarding FARP operations. Appendix A also provides a checklist to assist in planning. See the FARP organization in figure 7-1.

Figure 7-1. FARP Organization.

PLANNING CONSIDERATIONS

A FARP extends the combat radius of aircraft and reduces their turnaround time to the objective. Combat radius should be considered in terms of distance and time. If there is any doubt that the fuel and ordnance available for a mission is insufficient, a FARP should be
planned. FARP planners should consider location, employment techniques, refueling methods, equipment, and personnel requirements. In addition, planners should consider the following:

- Distance to, and the stability of, the forward edge of the battle area (FEBA) or forward line of own troops (FLOT).
- Required time-on-station.
- Security requirements for the FARP.
- Enemy’s ability to destroy the FARP with indirect fire.
- Availability of adequate road networks.
- Distance between the FARP and the nearest bulk fuel and ordnance supply points.
- Command and control requirements.
- Proximity to the main supply route (MSR).
- Coordination with the logistical effort.

**Location**

Mission, enemy, terrain and weather, troops and support available-time available (METT-T) should dictate where the FARP site is located. The tactical dispersion of the FARP depends on the terrain. The location must allow sufficient area for ground vehicles, aircraft operations, and material movement, and should provide terrain masking for cover and concealment.

Enemy radar should be assumed to be on any high ground or prominent terrain occupied by enemy forces. To determine the available radar mask, a line-of-sight (LOS) analysis is made of the FARP location. Three or four points with routes leading to the FARP and masked from
radar detection are established and used by aircraft going to the FARP. Leaving the FARP, aircraft return to a masked point and then, if required, move with high speed to resume their assigned missions. By using such passive security measures, aircraft can avoid having the FARP directly detected by radar.

FARPs should be established outside a missile engagement zone (MEZ). The Doppler radar returns from a large number of helicopter rotor systems close in makes it difficult to track other targets in the vicinity. Therefore, FARPs should be placed behind the MEZ or out of LOS with the LAAD units near the MEZ.

Return to force procedures should be thoroughly planned with the TACC’s air defense staff. Windows of time and/or specific routes should be planned for in advance so that air defense units are expecting friendly aircraft in their vicinity and are better able to identify returning aircraft, particularly in reduced visibility. Specific routes and corridors enable the air defense system to maintain the most advantageous weapons condition and as much reaction time as possible to protect the MAGTF.

Ideally, the FARP will be located approximately 17 to 25 kilometers from the FEBA or FLOT. This positioning ensures it is far enough to the rear to prevent enemy artillery preparatory fires from targeting the FARP, yet allows the quick turnaround of aircraft and logistical transportation supporting the operation. The FARP should be established on the inbound, return or outbound route relative to the objective. Each route has distinct advantages and disadvantages.

**Inbound Route**
A FARP established on an inbound route—

1. Ensures aircraft do not have to wait for fuel through staggered take-off and arrival schedules.

1. Allows assault forces to preposition closer to the objective area.
Provides the mission commander the opportunity to make a final analysis of the situation before continuing to the objective area.

Allows the mission planners flexibility for time lost because of aircraft mechanical problems and possible redistribution of loads.

Allows an aircraft to enter the objective area with the maximum fuel possible.

Provides the ability for aircraft to return to their base while they still have sufficient fuel remaining in the event the FARP is not operational or is detected by the enemy.

Allows embarked troops from assault support aircraft to augment the FARP security force.

Serves as a designated alternate fueling site when minimum fuel levels are reached.

A disadvantage of a FARP established on an inbound route is that the massing of assets for final coordination can provide a prime target of opportunity for the enemy.

**Return Route**

A FARP established on the return route is used by aircraft leaving the objective area to receive fuel and ordnance resupply before returning to the objective. To confuse enemy antiair defenses, the return route is not on either the inbound or outbound route. A FARP established on a return route—

- Allows the mission commander the opportunity to change the plan before aircraft return to the objective area.
- Allows an aircraft to reenter the objective area with the maximum fuel and ordnance possible.
A FARP established on a return route has the following disadvantages:

1. Congestion and refueling delays can be caused when aircraft departing the objective area simultaneously converge on the FARP.

1. The enemy can detect the FARP if aircraft departing the objective area are pursued to the FARP site.

1. A detected, destroyed, or inoperable FARP may not be able to refuel aircraft departing the objective area.

**Outbound Route**

A FARP established on an outbound route gives aircrews the option to bypass the FARP if fuel is not required.

A FARP established on an outbound route has the following disadvantages:

1. Congestion and refueling delays can be caused when aircraft returning to base converge on the FARP at the same time.

1. The enemy can detect the FARP if aircraft departing the objective area are pursued to the FARP site.

1. A detected, destroyed, or inoperable FARP may not be able to refuel aircraft departing the objective area.

1. Personnel departing an objective area on assault helicopters may not easily augment security for the FARP because prior briefing with ground forces may be limited.

**Employment Techniques**

In a sophisticated threat environment, a FARP may be required to move frequently. In a low-intensity situation with a static front and little enemy air activity, the requirement for FARP displacement will be reduced. Depending on the situation, multiple FARPs may be
employed or a single FARP may be relocated to different sites. The mobility of a FARP or multiple FARP locations provide the commander increased responsiveness and capabilities.

During establishment of multiple FARP sites or relocation of a single FARP, the new FARP should be operational before the old FARP is shut down. Speed of movement to establish the FARP site is of prime importance, and adequate time to set up equipment should be planned.

The mode of transportation used to establish FARPs should depend on the urgency of the mission. FARP employment techniques are mobile, aerial-delivered, and a combination of aerial- and ground-delivered.

**Mobile**

Mobile or truck-mounted FARPs are the most common means of employment. These FARPS are easy to coordinate, logistically flexible, and do not require support outside the ACE or tie up valuable aviation assets. Mobile FARPs are preferred when the tactical situation, terrain, and time allow for the movement of ground assets into the desired location.

Mobile FARPs usually support a specific mission and number of aircraft. These FARPs establish, execute their mission, and return to the origination site. Because resupply of the mobile FARP may be necessary, planners must consider—

- Availability of adequate road networks.
- MSR.
- Distance to the FARP.
- Timing.
- Security requirements.
- Threat.
Aerial-Delivered
The use of assault support assets is an alternate means of establishing a FARP. Aerial-delivered FARPs are used in tactical operations requiring rapid emplacement, initial stocking and resupply or displacement which may not be accomplished by ground transportation due to time, distance, inadequate road networks, terrain or enemy. Aerial resupply of the FARP should be limited because of the large quantities of fuel and ammunition and other priorities placed on assault support helicopters. In addition, continued aerial resupply of the FARP can increase the probability of detection by enemy electronic warfare surveillance equipment and visual reconnaissance.

Combination of Aerial- and Ground-Delivered
A combination of aerial- and ground-established FARPs may be operationally desirable under certain situations. For example, if an attack helicopter squadron receives a rapid commitment order, the FARP may be initially established by air with enough Class III (bulk POL) and V (ordnance) supplies for one turnaround per helicopter. Continued operation could then rely on surface transportation for sustainment.

Refueling Methods
Aircraft use either the hot or cold refueling method. The preferred method is hot refueling because it is faster than cold refueling. NAVAIR 00-80T-109 provides depictions of typical hot and cold FARP layouts.

Hot Refueling
The term hot refueling describes refueling of an aircraft with the aircraft engines operating. Aircraft authorized to hot refuel are equipped with a closed-circuit refueling receiver and single-point pressure refueling receiver that incorporate an automatic fuel shutoff capability.

Cold Refueling
This refueling method is accomplished by shutting down the engines, turning off all switches, and, for helicopters, waiting until the rotor
blades have stopped turning and are secured. Pressure and open-port methods are used in cold refueling.

**Equipment**

The MWSS possesses a variety of fueling assets that can support FARP operations. Each asset is employed based on mission requirements, FARP location, and availability.

*Helicopter Expedient Refueling System*

The HERS is an expeditionary aircraft fuel dispensing system designed for use in forward areas for primarily attack helicopters. The HERS is helicopter transportable and can be inserted far forward in the battle area. This system is capable of employing eighteen 500-gallon pods with supporting components and a total fuel capacity of 9,000 gallons. The HERS can be rapidly installed, and it shares common components with the TAFDS that is also in the MWSS inventory. This system must be replenished often to give extended fuel support.

*M-970 Refueler*

The M-970 fuel trailer is a 5,000-gallon, fuel-dispensing semitrailer designed for under- and over-wing aircraft refueling. The fuel trailer is equipped with a filter separator, recirculation system, and two refueling systems (one for under-wing and one for over-wing servicing). Normal fuel capacity is 5,000 gallons for highway travel and 3,800 gallons for cross-country travel. The M-970 is not designed as a rough terrain vehicle asset; therefore, site location and accessibility are critical concerns when employing this asset to support FARP operations.

*SIXCON Tank Module*

The SIXCON tank module is primarily used for storing, transporting, and dispensing bulk liquids. This container can be transported by helicopter, LVS or 5-ton truck. Five fuel storage modules and one 125-gallons-per-minute fuel pump module join together to form an 8- by 8- by 20-foot, International Organization for Standardization/American National Standards Institute-configured module that can pump and
store approximately 4,500 gallons of fuel. Each module can hold approximately 900 gallons. Weight distribution for some SIXCON tank modules manufactured without baffles may render total load as top-heavy; therefore, caution must be taken when configuring SIXCON modules for FARP operations.

Personnel Requirements

The FARP OIC or air boss (normally a pilot) supervises and directs FARP operations, to include fuels section, ARFF team, EOD section, ordnance crew, maintenance crew, and security personnel. A corpsman and radio operators will also be assigned to the FARP OIC or air boss.

Fuels Section

A minimum of six personnel are required for hot refueling aircraft when operating a two-point system: one line noncommissioned officer (NCO), one pump operator, and a nozzle operator and a refuel point operator at each point. Eleven personnel are required to operate a four-refueling point site: a line NCO, two pump operators, and a nozzle operator and a refueling point operator at each of the four refueling points. For planning purposes, a FARP should have a line NCO for every four points, a pump operator for every pump, and a nozzle operator and a refuel point operator at each refueling point. The nozzle operator is a crew chief, plane captain or a qualified person per NAVAIR 00-80T-109. Additionally, it is highly recommended that taxi directors be used at each refueling point for terminal guidance.

ARFF Team

Normally, one ARFF crew and rescue vehicle will support a FARP. The extent of ARFF support at the FARP depends on the size and complexity of the operation. Refer to NAVAIR 00-80R-14 to identify the minimum ARFF requirements needed at FOBs.

EOD Section

Because of the limited number of EOD technicians within an MWSS, EOD employment must be done judiciously; therefore, the situation
and operational requirements will determine EOD participation during FARP operations. EOD personnel can provide assistance during FARP operations, but they are primarily employed to clear UXO along movement routes and within the FARP site.

**Ordnance Crew**
A minimum crew of four trained ordnance personnel is normally required during any arming/dearming or loading/downloading sequence. The mission and ordnance requirements will determine the number and type of ordnance personnel to support the FARP. Flying squadron ordnance personnel may be required to conduct arming/dearming or loading/downloading sequence and IMA personnel may be required to build and assemble ordnance at the FARP.

**Maintenance Crew**
Based on the mission and availability of personnel, maintenance crews may or may not be included within the FARP organization. Normally, maintenance activities within the FARP are limited. In most cases, maintenance personnel are on call. If a problem exists beyond the maintenance crew’s capabilities, additional ACE maintenance personnel and equipment are brought to the FARP to effect necessary repairs.

**Security Forces**
Security personnel will normally come from established ACE security forces. These forces may or may not include military police. The composition of the security force is based on the situation, mission, and threat. These forces provide security for convoys en route to the FARP and for FARP personnel and equipment during operations. Besides focusing on ground-related threats, FARP security forces may include LAAD assets to combat air threats.

**DEFENSE**

The FARP defense is broken down into ground and air defenses.
Ground

Organic personnel, including technicians and security forces (military police and/or guard force), provide the principal FARP ground defense. Reconnaissance personnel and GCE assault force personnel passing through the FARP may also be integrated into the FARP’s defense for limited periods.

Reconnaissance personnel can be used to ensure that the designated FARP location is suitable for FARP operations and can provide initial security until FARP security forces are in place. In addition, reconnaissance personnel can provide zone intelligence updates, which can be passed to the aircraft commander (airborne). Because aircraft must off-load nonessential personnel during refueling operations, disembarked assault forces may be used to augment the FARP defense while they are within the FARP and waiting to load the aircraft.

A tactical air control party can also be inserted into the FARP to provide a link with most supporting arms. CAS for the FARP may consist of organic and nonorganic rotary- and fixed-wing assets. However, integration of any of these units and assets into the FARP defense requires extensive planning and coordination before execution to reduce confusion and delays.

Air

Air defense could encompass rotary- and fixed-wing escorts of assault support aircraft and the integrated air defense of LAAD. LAAD personnel may be employed either separately, inserted into the FARP site area with the reconnaissance or assault forces or accompany the FARP personnel moving into the FARP site. Either way, the LAAD OIC or section leader must be involved in the FARP planning to ensure LAAD personnel are properly integrated into the FARP defensive plan.

To plan the FARP air defense, the LAAD section leader should be thoroughly briefed on the FARP operations (e.g., types and number of
aircraft, aircraft approach and departure direction). The LAAD section leader normally is located in close proximity with the air boss or FARP OIC to receive current aircraft information. In most cases, the LAAD section leader receives current situational awareness from the FARP communications links.

**COMMUNICATIONS**

FARP operations require external and internal communications. The FARP OIC or air boss requires external communications to higher headquarters and pilots in the aircraft.

Internal communications requirements are necessary to command and control the following organizations within the FARP:

- MWSS detachment.
- MWCS detachment.
- MALS detachment.
- LAAD.
- Security detachment.

The MWCS is responsible for the external communications requirements, while the MWSS is responsible for the internal requirement. Agencies within the FARP will monitor the FARP control net.

Each organization may have its own internal frequency to coordinate their specific functions. Fuels, ARFF, and EOD use the air operations net and maintenance and ordnance use the maintenance control net.

The FARP should have both UHF and VHF capability. The number and types of frequencies within the FARP are mission dependent. If there is no MATC detachment at the FARP, aircraft will switch to FARP control on approach to receive terminal guidance.
The FARP frequencies, call signs, and radio procedures should be briefed during the aviator’s mission brief. Once the aircraft are within the FARP, the majority of fueling and ordnance operations should not use radio communication.

Radio transmissions shall be kept to a minimum during dearming, refueling, and arming procedures. Aircraft and ground personnel should make initial contact with one another before aircraft enter the FARP. Table 7-1 shows the communications architecture normally employed during FARP operations.

Table 7-1. FARP Communications Architecture.

<table>
<thead>
<tr>
<th>FARP Units/Nets</th>
<th>HD-1 (DASC)</th>
<th>FARP (UHF)</th>
<th>FARP Control (VHF)</th>
<th>Airfield Operations¹ (VHF)</th>
<th>Maintenance Control¹ (VHF)</th>
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P=primary coordination net  M=monitor

¹The airfield operations and maintenance control net use handheld radios.
²Security forces should have their own control frequency, if possible.

LAYOUT CONSIDERATIONS

The FARP layout will be predicated on the type of FARP (hot or cold), the equipment used, the number of refueling points required, the types
of aircraft being serviced, and the ordnance support requirements. Appendix A provides some layout configurations typically used when conducting FARP operations. These layouts and others can be tailored to fit specific missions as long as NATOPS safety restrictions are met. Refer to NAVAIR 00-80T-109 for specific aviation ground refueling requirements, procedures, and limitations. When designing the FARP layout, planners must consider the following:

1. The space between aircraft and refueling points must accommodate the largest helicopter expected to utilize the FARP. The standard layout should accommodate aircraft sizes up to the CH-53E.

2. Wind direction must be calculated to accommodate aircraft landing, refueling, and take off.

3. Fueling equipment must be placed on high ground within the FARP site, because fuel vapor, which is heavier than air, collects in depressions and hollows.

4. Equipment must be positioned in a location that provides adequate drainage away from the equipment and refueling points in the event of fuel spills or sudden rainfall.

**ROUTING AND AIRCRAFT CONTROL PROCEDURES**

Aircraft going to the FARP should enter from a designated initial point. If there is no MATC detachment at the FARP, individual flight leaders will provide separation and control of aircraft into the FARP. The FARP OIC will maintain VHF and UHF radio communication.

The pre-briefed landing pattern shall be the same for all aircraft operating at the FARP. Procedures for wave-offs at the FARP and the staging areas should be pre-briefed and conform to the pattern established in that area. The heading for final approach to the FARP should be determined during the planning phase and may be terrain dependent. The final approach should be marked with LZ panels, markers, or airfield lighting assets (e.g., IR lights, chemical lights).
Aircraft should avoid over-flying the FARP while other aircraft are in the site. If other aircraft are waiting at the primary staging area, incoming aircraft will be directed to land at the alternate staging area. A right-hand landing pattern is desired. Pattern altitudes shall be specified and selected in accordance with METT-T considerations. Orbiting of the FARP should be avoided to prevent the enemy from detecting and targeting the FARP.

FARP aircraft directors can provide terminal guidance with hand and arm signals and night vision goggles (NVG) compatible wands. Depending on the number of aircraft and complexity of the operation, an MMT may be used to provide procedural control to incoming aircraft and airspace deconfliction. If emission control conditions allow, the flight leader will call the FARP for clearance to land at the fuel point, the staging area or an alternate staging area, depending on traffic and refueling priority.

**COLD REFUELING PROCEDURES**

Cold refueling procedures are used for but are not limited to attack aircraft requiring ordnance uploads. Although inherently more time consuming, cold refueling operations are simplistic in design and require minimal aircraft movement. Refer to NAVAIR 00-80T-109 for procedural information.

**HOT REFUELING PROCEDURES**

Hot refueling operations are generally more complex and dangerous than cold refueling, because hot refueling FARPs consist of more moving parts and fueling occurs while aircraft engines are running. Aircraft enter the FARP via predetermined routing procedures, land in the prestaging area to dearm, and taxi to a designated fueling point. When fueling is complete and it is safe, the aircraft taxi to the post-staging area where it will either arm or shut down to receive ordnance uploads. Pre-refueling and post-refueling staging area locations should be thoroughly briefed and understood by aircrews that will use the FARP.
In the pre-stage landing area, aircraft position to dearm their ordnance and to wait when FARP refueling points are full. Aircrew can dearm assault support aircraft; however, only a qualified ordnance team can dearm attack aircraft in the pre-stage area. This landing area should be within visual range of the FARP and be large enough to contain at least a division of aircraft. The use of the pre-staging area will preclude flights of aircraft orbiting the FARP. Aircraft director support normally will not be available at the pre-staging area. The pre-staging area will be marked for assault and attack aircraft (see appendix A diagrams). Procedures for hot refueling aircraft carrying explosive ordnance on board can be found in NAVAIR 00-80T-109.

**PRE-OPERATIONAL PROCEDURES**

Before aircraft arrive in the FARP, FARP operators should—

1. Verify that a minimum of one fire extinguisher is in the immediate vicinity of the fuel source and the refueling point.

2. Clear areas that may be susceptible to rotor downwash.

3. Ensure that visual landing aids (e.g., panel markers, NVG-compatible lighting) are securely anchored/attached to the ground at the fuel points and pre- and post-staging areas.

4. Ensure the site is clear of loose debris or FOD-producing material.

5. Ensure there are no depressions or protrusions in the landing areas that exceed 10 inches.

6. Ensure the slope of the FARP area (landing points) do not exceed 5 degrees.

7. Use locations that minimize soil disturbance from heavy FARP equipment and aircraft.

8. Verify availability of access roads.
EMERGENCY FIRE AND RESCUE PROCEDURES

FARP personnel must follow procedural steps in a fire or crash emergency. Ground and air crewmembers should follow the basic emergency fire and rescue reaction steps outlined in NAVAIR 00-80T-109; specific steps depend on the emergency. Either a ground or air crewmember can man the fire extinguisher nozzle during a fire emergency.

ADDITIONAL PROCEDURES

A FARP may be established to provide fuel and ordnance for several days in support of sustained operations, or it may be required to provide fuel for a period of hours in support of a raid. Depending on the mission, FARP personnel may employ procedures for emergency breakdown and evacuation, night operations, ordnance, or crew-served weapons.

Emergency Breakdown and Evacuation

In the event the FARP comes under attack, participants must be familiar with the load plan and the sequence of extract. The hard rules are that security forces will be the last out, refueling equipment is considered expendable, and supporting arms must be preplanned and used. Standardized procedures are not established for this evolution; therefore, each mission will develop its own procedure according to METT-T and the availability of supporting units.

Night Operations

Because of the sophisticated threat anticipated during future operations, using the hours of darkness for helicopter operations will enhance survival. This increased requirement for a night operation capability dictates that detailed planning take place at all levels, because night activities inherently take longer to complete. FARP night activities will normally be set up for NVG operations. Taxi directors should use wands with cones or IR chemical lights.
Ordnance

Loading and downloading of ordnance and fueling of aircraft must be conducted as separate activities. The aircrew preflight briefing will include the arming/dearming location and loading/downloading locations of the FARP. Ordnance personnel should use the appropriate NATOPS checklists during ordnance activities. Refer to NAVAIR 00-80T-103, *NATOPS Conventional Weapons Handling Procedures Manual (Ashore)*.

Crew-Served Weapons

After refueling, an aircraft in the post-refueling staging area that requires ammunition for crew-served weapons will signal the ordnance personnel using prearranged signals. Arming and dearming of crew-served weapons shall be accomplished in accordance with applicable weapon procedures.

SAFETY

Safety is the responsibility of all personnel and shall be the determining factor before, during, and after activities involving Class V (A) munitions and refueling operations. Unsafe situations, practices, or procedures observed by any person should immediately be brought to the attention of all hands, and ordnance and refueling activities must immediately stop until the unsafe condition can be eliminated.