DEPARTMENT OF TACTICS
UNITED STATES ARMY AVIATION SCHOOL
FORT RUCKER, ALABAMA 36360

Tactical Implementation Memo
Number 67-1

28 December 1967

1. To implement day by day changes in OPORDs and to insure that sufficient guide lines are written as standardized references, memos of this type will be published for each OPORD.

2. OPORD Number 1: The following information is to supplement Section I Rotary Wing Tactical Flight Maneuvers Guide.

a. Tactical formation break up:

(1) Break up of formation into single aircraft: The flight leader directs an echelon formation initially for this maneuver. After the formation has closed into an echelon the flight leader will designate the number of seconds (normally 10 sec) between breaks. Upon the command "execute" the lead aircraft will turn 90° away from his wingman. After a delay of the designated time the number two aircraft will break in the same direction and state "(Callsign) breaking right (left)". This procedure will continue until the formation breakup is complete.

(2) Break up of formation into two aircraft elements: The flight leader directs a staggered trail formation initially for this maneuver. After the formation has closed into a staggered trail the flight leader will announce the time interval between elements and receive an acknowledgement. On the command "execute" the first two aircraft will continue on course and if load and flight condition permit will increase airspeed by 10 knots. The remainder of the aircraft will slow by pairs (3 and 4, 5 and 6, etc) until desired separation is attained.

An exception to the above procedure must be used with large formations to avoid stacking up of the last aircraft. This exception is at the command, "execute" the lead aircraft will enter a standard rate (right or left, as designated) 180° turn. Each subsequent two aircraft element will fly his designated separation interval and then enter a standard rate 180° turn in the same direction as the lead element. As the turn is complete the flight has proper separation and can continue in the desired direction for mission accomplishment.

b. Rendezvous and join up: The flight leader will approach the rendezvous point at the preplanned time and altitude. Upon reaching the rendezvous point he will enter an orbit in the preplanned direction using a standard rate turn and an airspeed of 60 knots. Joining members of the flight will approach the lead aircraft by crossing his orbit at 70 to 80 knots and at the same altitude. As final join up is completed airspeed will be reduced and heading varied so as to close into position at 60 knots and 45° to the lead aircraft. Planning and judgement must be exercised at all times to insure a safe rate of closure is maintained and that the common error of overrunning is avoided.

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Tactical Implementation Memo
Number 68-1

27 February 1968

UH-1 (All Models) Emergency Starting Procedures

Tactical Implementation Memo Number 67-2, dated 29 December 1967 was rescended with the issue of the new UH-1 checklist, dated Jan 68; however, the following items are still applicable:

a. After aborting a start in the UH-1, no student will attempt a restart until maintenance assistance has been received or an instructor pilot has been consulted.

b. Emergency start procedures will not be performed by students. Students will only be briefed by the instructor pilot on these procedures and their possible combat use.

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Tactical Implementation Memo
Number 68-2

27 February 1968

Operational Area Reconnaissance: (Applicable to OPORD 3 and OPORD 4)

1. This maneuver allows the student to compare the Fort Rucker local area checkout, orientation, and map updating, to a new tactical area of operations within a combat zone.

2. Definition: Operational area reconnaissance is a general survey of the supported units Tactical Area of Responsibility by air, to determine and preplan for special aviation problems which may exist or occur.

3. To conduct an operational area reconnaissance certain information must be provided the aviator/observer team. The minimum necessary information would be:

a. Map coverage, and grid or check point system.

b. Unit or units to be supported; with boundries, CP locations, and logistical base locations.

c. Intelligence briefing to include possible AW positions or past anti-aircraft activity.

d. Frequencies and call sign of all units in the TAOR.

e. Aviation support activities, to include fuel and maintenance.

f. Artillery fire base locations, with frequencies for fire information.

g. Special areas, such as no fire areas and restricted flying areas.

4. Other information which if possible, should be provided.

a. Expected length of operation within new TAOR.

b. Expected meterological conditions which will normally exist for the time of year.

5. Performance:

a. Preflight Planning: Given information consolidated, maps plotted, general map reconnaissance performed, and routes to be flown selected.

b. Inflight: A general survey at or above 1500 feet absolute would be made to confirm dominate terrain features, night and low visibility routes and navigational check points, man made features which may not appear on the map and the likely number of acceptable PZ's and LZ's. It must be remembered that other types of reconnaissance, cover the special missions such as routes, LZ's or area and that details in all these areas cannot be gained during this general survey.

c. Debriefing: Information gained must be consolidated and passed on to the unit operations as well as to the operational aviators within the unit.

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Tactical Implementation Memo 25 March 1968
Number 68-4

LOW LEVEL APPROACH (APPLICABLE TO OPORD 5)

1. Definition: A descent to a landing or hover from a low altitude flight path.

2. Purpose of maneuver: The low level approach to landing permits the pilot to utilize the cover and concealment of low level flight technique to enter landing areas of varying size with minimum exposure.

3. Performance of maneuver: Contact ground party to determine as many of the following requirements as possible, enemy situation, condition of LZ, size of LZ, and wind direction. Approach on a low level flight path. (50 feet above obstacles) Initiate a deceleration from cruise airspeed (80 knots) to approach speed (60 knots) when within $\frac{1}{2}$ to $\frac{1}{4}$ mile from LZ. Continue low level flight path at (60 knots) approach speed until desired point of touchdown is sighted. Plan to intercept a descent angle of 8° to 15° from flight path to touchdown site and lead the angle of descent by further deceleration of the aircraft. Upon intercepting the descent angle (8° to 15°) continue deceleration and descent so as to arrive at point of touchdown with minimum airspeed and minimum altitude.

4. Special characteristics of maneuver:

a. The low level approach differs from normal and steep approaches in that the angle of descent starts from a low level (80 to 150 feet) rather than a higher level (300 to 500 feet).

b. The angle of descent to the desired point of touchdown will be no steeper than a steep approach angle (12° to 15°) and no shallower than a normal approach angle (8° to 10°). This angle of interception seems to occur more rapidly due to the low height of the aircraft above the ground and the pilot should lead the angle with reduction in collective to further reduce airspeed just prior to intercepting the angle. Once established on the angle of approach (100 meters to 300 meters from touchdown) the pilot applies collective and cyclic forces as necessary to reduce airspeed and maintain his angle of descent to the touchdown point.

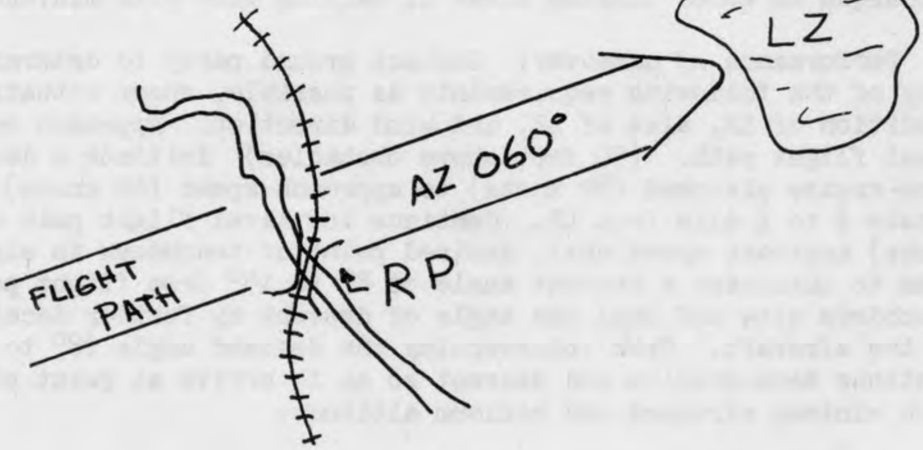
5. Techniques of low level approaches. At low level in dense woods, it is not always possible to see the touchdown area until the last

moment. At speeds of eighty knots or more it could cause overshooting a small area. Several techniques to prevent this overshooting or missing the LZ are:

a. Use of another aircraft at a higher altitude directing the low level aircraft by vectors and information of distances to the LZ.

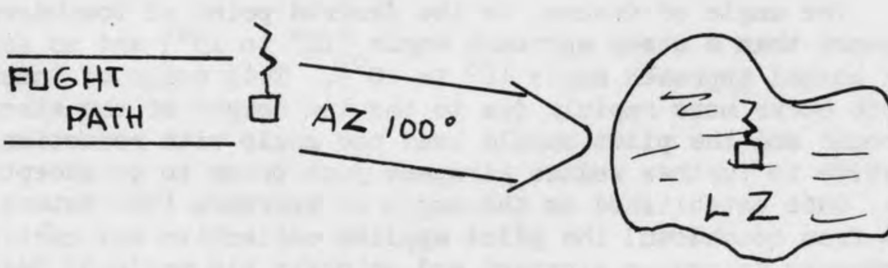
b. Preplanned missions that have an excellent terrain feature easily identified that can serve as a release point in close proximity to the LZ.

EXAMPLE:



c. Navigational aids set up in close proximity to the LZ or on the LZ.

EXAMPLE:

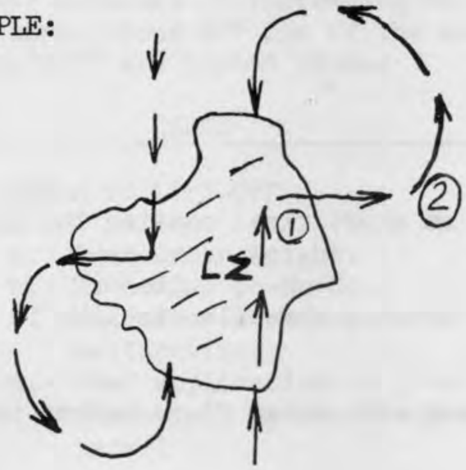


d. Any other means of identifying flight path and distance to desired touchdown area, such as the use of friendly units, pilotage, radar information, directions from troops on the ground, flares fired by the ground troops on command of the pilot, and/or numerous other means, left only to the imaginative aviator.

e. In heavy forests, similar terrain, and areas of high jungle canopies, the first approach of the pilot may result in overflying or passing left or right of the LZ. The pilot can salvage his approach in several ways:

(1) The 90° - 270° approach.

EXAMPLE:



(1) A/C overflies LZ at 60 kts.
(2) A/C at 60 kts turns left or right 90° from flight path.
(3) A/C immediately turns 270° in opposite direction. Returns to LZ.
*All turns with consistent angle of bank.

If wind is a factor - overfly LZ the second time and repeat 90° - 270° turns.

(2) Rectangular pattern approach.

EXAMPLE:

(1) A/C passes left of LZ - Determines LZ AZ - 30°.
(2) A/C turns to opposite side of LZ standard turn 180°, to LZ's long axis.
(3) A/C flies on heading 1 minute.
(4) A/C turns to LZ AZ - 030° and proceeds to landing.
(5) If LZ is missed report procedures.

Winds at low level are usually not so strong that the LZ will be missed completely due to wind drift.

(3) Tear drop approach.

EXAMPLE:

(1) A/C passes LZ and notes LZ AZ - 030°.
(2) A/C turns to 000°(-30°) to left. Flies out 40 seconds.
(3) A/C turns to AZ 210 and proceeds to landing.

6. Common errors.

a. Continuing excessive airspeed on short final causing the aircraft to overshoot desired touchdown.

b. Gaining altitude on final, go-around, or while circling in order to keep the LZ in sight.

c. Attempting to stop forward speed with steep flare rather than a uniform deceleration.

d. Slowing down too soon, too far out from touchdown.

e. Steep turns close to the ground in attempt to remain in close to the LZ.

f. Flying too shallow on approach angle when obstacles are cleared.

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DEPARTMENT OF TACTICS
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Tactical Implementation Memo
Number 68-5

26 March 1968

LOSS OF ROTOR RPM
(Applicable to all Load Training)

There are many situations which an operational aviator in a combat environment may be faced with before he has a large number of flight hours under his belt. In most of these situations he must depend upon his own knowledge and skill.

In the interest of increasing this knowledge some of the common causes and corrections for one of the most common of these problems "Lost Rotor RPM" are listed below:

CAUSE	CORRECTIVE ACTION
1. PRIOR TO LIFT-OFF	
a. Over Gross Weight.	a. Lighten load.
b. Exceeding Go-No-Go.	b. Lighten load. (400 lbs = 1% N_1)
c. Engine or Governor Malfunction.	c. Maintenance.
d. Fast application of pitch. (Exceeding N_2 acceleration rate.)	d. Apply small amount of pitch to allow N_1 gas producer time to accelerate through its low RPM area. Then the collective application will not result in low N_2 and rotor RPM.
2. AT A HOVER	
a. Over gross weight.	a. Lighten load.
b. Exceeding Go-No-Go.	b. Lighten load. (400 lbs = 1% N_1)
c. Excessive control movements.	c. Make small, smooth corrections. Eliminate unnecessary control movements.
d. Downwind flight.	d. If downwind hover cannot be avoided, hover at lower altitude or slide skids along ground, terrain permitting.

CAUSE	CORRECTIVE ACTION
3. ON TAKE-OFF (Prior to trans lift)	
a. Excessive acceleration attitude.	a. Apply aft cyclic, maintain altitude with collective.
b. Excessive pitch application.	b. Level skids, reduce collective.
c. Loss of effective ground cushion.	c. Level skids, land aircraft, regain RPM.
d. Downwind Flight.	d. Level skids, land aircraft. Reduce load or take-off into wind.
(After trans lift)	
a. Excessive acceleration attitude.	a. Apply aft cyclic, maintain altitude with collective.
b. Excessive pitch application.	b. Apply aft cyclic, reduce collective.
c. Turbulent air caused by rotor wash in formation flight.	c. Seek clean air, stabilize RPM, rejoin formation.
4. IN FLIGHT	
a. Turbulent air caused by rotor wash in formation flight.	a. Seek clean air.
b. Excessive airspeed for load conditions.	b. Reduce power (airspeed).
5. ON APPROACH (Prior to loss of Trans Lift)	
a. Turbulent Air caused by rotor wash in formation flight.	a. Seek clean air.
b. Sudden and excessive pitch application.	b. Anticipate power requirements to allow N_1 acceleration.
c. Excessive cyclic movement.	c. Stop unnecessary cyclic movments.
(After loss of Trans Lift)	
a. Turbulent Air.	a. Level skids, cushion landing with remaining pitch.

CAUSE	CORRECTIVE ACTION
5. ON APPROACH (After loss of Trans Lift)(Cont)	
b. Downwind Flight.	b. Avoid if possible. If altitude permits, decelerate, momentarily lower pitch to gain RPM and make run-on landing.
c. Sudden and excessive application of pitch.	c. Reduce pitch, reapply slowly.
d. Excessive cyclic movement.	d. Stop unnecessary movement, reduce pitch to gain RPM.
6. EXTERNAL LOAD OPERATIONS	
a. Exceeding gross weight limitations.	a. Lighten load. (Remember for a given gross weight approximately 5 PSI more torque is required to hover out of-ground effect versus in-ground effect.
b. Excessive and erratic control movements.	b. Stop control movements, momentarily reduce pitch.
c. Excessive acceleration attitude.	c. Decelerate and reduce pitch.
d. Turbulent air.	d. Seek clean air.
	(NOTE: If flight cannot be maintained, land load or jettison load before RPM becomes critically low.)

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DEPARTMENT OF TACTICS
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Tactical Implementation Memo
Number 68-6

16 April 1968

1. Status of Tactical Implementation Memos.

a. Current: 67-1, 68-1, 68-2, 68-3, 68-4, 68-5.

b. 68-3 current, but suspended from issue and use until further notice.

2. Maximum Performance Hover and Level Acceleration Takeoff.

a. Maneuver applicable to all dual OPORD's where single aircraft with internal loads are flown. Maneuver may also be performed during formation flight periods. (Single helicopter departures) The student will not perform this maneuver while solo but will use standard Go-No-Go chart procedures.

b. Definition: The takeoff with two foot hover power at high gross weights (D model 9000 - 9500 lbs) (B model 7500 - 8500 lbs) provides the pilot with a means of taking off from areas that have suitable terrain relatively free of barriers, when Go-No-Go 2% N_1 reserve is not available and mission accomplishment dictates.

c. General: The UH-1 Operators' Manual readily points out the two foot skid height as most advantageous for clearing barriers at high gross weights. Most helicopters in a combat zone are operated at or near maximum gross weights a high percentage of the time, and much can be gained by pilots fully understanding the advantages of the takeoff from two feet instead of light on the skids. This implementation can render valuable gains in aircraft utilization and mission accomplishment, but aviators must accept the fact that this takeoff is to be used only if a two foot hover and ground cushion can be maintained until reaching translational lift.

d. Performance of Maneuver

(1) Terrain. Before this type takeoff can successfully be completed the terrain should be generally level and free from obstacles such as large rocks or tree stumps. Tall grass such as elephant grass may dissipate lift and cause the takeoff to be impossible. Water under the takeoff path will also cause a loss of lift when the takeoff is attempted. The takeoff should not be attempted when obstacles have to be cleared in a short time after takeoff or where ground cushion cannot be maintained.

(2) Execution of Takeoff. After the pilot has determined that the helicopter can be hovered at two feet above the ground and the terrain will permit this type takeoff, the helicopter should be put on the ground to allow the engine inlet temperature to cool for a few seconds. The helicopter is then flown vertically to a skid height of two feet above the ground, accelerated at two feet to the climbout airspeed (approximately 20 knots) and held at that airspeed until the obstacles are cleared. Care should be exercised to maintain the proper pitch attitude of the helicopter. An excessively nose low attitude will require an excess amount of power to maintain altitude causing RPM bleed off; whereas, a nose high attitude will prolong reaching effective translational lift and therefore lengthen the distance required to clear an obstacle. After reaching translational lift, an airspeed of approximately 18 - 20 knots (as recommended in the UH-1 Operators' Manual, chart, takeoff distance - feet) should be maintained to give shortest takeoff distance to clear an obstacle. If the skid height is greater than two feet prior to obtaining climb out airspeed, the takeoff

distance will be greater or if the climb out airspeed is greater or less than the value given in the takeoff distance charts listed in the -10 (approximately 20 knots), takeoff distance will be increased. Under power limited conditions (two foot hover and full power available) a slight nose down flight attitude is required during acceleration. If loss of lift occurs in the area just prior to translational lift the helicopter shall be leveled to avoid ground contact with the forward portion of the skids. If ground contact does occur, takeoff distances will be greatly increased in addition to the possibility of skid damage. If the helicopter cannot hover two feet above the ground without lowering RPM or if obstacles, terrain, or wind conditions are not suitable for this type takeoff, gross weight should be reduced.

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Tactical Implementation Memo
Number 68-7

16 April 1968

TACTICAL OPERATIONS USING THE INTERNAL TANK EQUIPPED UH-1B

1. General.

This memorandum presents details concerning the water tank loads which have been installed in the Tactics' fleet UH-1B aircraft.

2. Description.

Water tanks have been installed in the UH-1B aircraft to provide loaded aircraft for student training. The water tank is the UH-1 ferry flight fuel tank. The tank installation weighs approximately 400 pounds empty. This figure includes 200 pounds of concrete blocks or sand cans which are secured on the floor under the tank. When the tank is filled, the whole installation weighs approximately 1400 pounds. This installation allows a convenient means to vary the load by rapid loading and unloading.

3. Use of the water tank load.

a. The water tank will be full unless otherwise noted in the 2408-13. When reducing the load neither sand cans nor blocks will be removed. Anyone changing the status of this full load is required to record the change in the 2408-13.

b. Since the fuel tank was designed for use in the aircraft, the aircraft can also be safely flown with any water tank load, power permitting. However, the maximum slope landing to be negotiated with a reduced water load is approximately 7°. Adherence to this limitation will prevent mast bumping which may occur under certain wind conditions.

c. Present modifications to the tank top prevents a preflight internal examination of the tank. These modifications are expected to be completed within the next two months. They include a bolted bar over the top of the tank which will physically prevent any filling or examination of the tank from the top.

d. The water quantity can be checked by carefully examining the transparent plastic tube mounted on the tank. Occasionally, it is difficult to determine the water level in this manner due to cloudy conditions in both the water and the tube. A work order to affix a color float marker to indicate this level is now under contract. In addition, the tank will be stencilled to designate the load weight at various water levels.

e. The tanks are to be drained by use of hoses with fittings which match the valve at the bottom of the tank. Originally, there was a hose with each tank, but apparently some of these have disappeared. PAMI personnel working in vicinity of these aircraft will drain the tank if requested. The PAMI management has requested that their personnel service these tanks whenever possible. If it is necessary to drain a tank by either an instructor or student, it is only necessary to open the valve by inserting a small device in the drain valve. As a field expedient, a pencil will usually be sufficient for this purpose if a hose is not available. However, it is important to direct the water outside the aircraft. A paper guide will usually suffice for this purpose.

f. Varying the aircraft weight for flight.

(1) Whenever possible, the full water tank and fuel tank load will be carried to start a flight period. However, if a takeoff cannot be accomplished because of the weight, the load is to be adjusted by reducing the water as outlined above in para 3e. For dual flights only the load is reduced in sufficient amount to enable a sustained 2 foot hover with stabilized 6600 RPM. This will permit a maximum gross load takeoff as described in Tactical Implementation Memo Number 68-6. Solo flights must use the go-no-go guide to determine weight reduction.

(2) When convenient and prior planning allows, it is possible to vary the fuel load rather than the water load. However, no fuel is to be drained and a thirty minute fuel reserve is to be maintained for planning purposes on all flights.

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difficult to determine the water level in this manner due to cloudy conditions in both the water and the tube. A work order to affix a color float marker to indicate this level is now under contract. In addition, the tube will be stenciled to designate the load weight at various water levels.

6. The tanks are to be drained by use of hoses with fittings which match the valve at the bottom of the tank. Originally, there was a hose with each tank, but apparently some of these have disappeared. [illegible] personnel working in vicinity of these aircraft will drain the tanks if requested. The [illegible] management has requested that their personnel service these tanks whenever possible. If it is necessary to drain a tank by either an instructor or student, it is only necessary to open the valve by inserting a small device in the drain valve. As a field expedient, a pencil will usually be sufficient for this purpose if a hose is not available. However, it is important to direct the water outside the aircraft. A paper guide will usually suffice for this purpose.

b. Varying the aircraft weight for flight.

(1) Whenever possible, the full water tank and fuel tank load will be carried at start of flight period. However, if a takeoff cannot be accomplished because of the weight, the load is to be adjusted by draining the water as outlined above in para [illegible]. For dual flights only the load is reduced a sufficient amount to enable a [illegible] 2 foot hover with stabilized [illegible] RPM. This will permit a maximum gross load takeoff as described in Technical Implementation Memo Number 65-6. Solo flights must use the [illegible] to determine weight reduction.

(2) When convenient and prior planning allows, it is possible to vary the fuel load rather than the water load. However, no fuel is to be drained and a thirty minute fuel reserve is to be maintained for planning purposes on all flights.

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