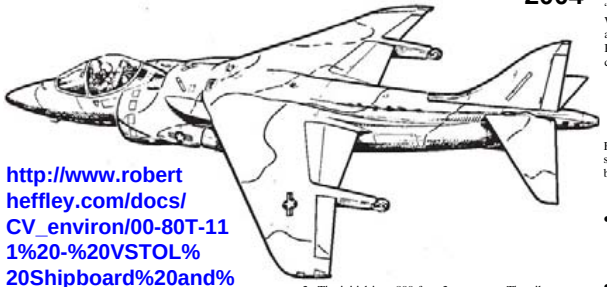

http://www.robertheffley.com/docs/CV_environ/00-80T-111%20-%20VSTOL%20Shipboard%20and%20LSO%20Manual.pdf

### 6.3 CASE 1 RECOVERY

**6.3.1 Case 1 Defined.** Case 1 recoveries are conducted when the weather is 3,000/5 or better. A VFR recovery is conducted to the overhead. Case 1 recoveries are the preferred recovery method for day and night VMC operations.

**6.3.2 Day Case 1 Procedures.** The Day Case 1 procedures are as follows:

1. If departing from marshal through an overcast, the pilot shall comply with the departing marshal instructions (paragraph 6.2.5) until VMC is reached. At that time, the pilot shall report "Canceling IFR" and proceed directly to the initial.

2. The pilot shall report "See you" when Mother is in sight.

3. The initial is at 800 feet, 3 nm astern. The pilot shall strive to be at the initial in order to meet the Charlie time and set state (from the initial to crossing the deck requires 2 to 3 minutes and 300 to 400 pounds). The initial shall be reported to Tower. Tower shall transmit "Winds are _____," "Continue" or "Cleared to break."

4. The pilot shall fly up the starboard side of the ship for a level 800-foot break. The break shall not be conducted unless cleared by Tower. Lead should break 10 seconds past the bow followed by 14-second intervals for each wingman. No aircraft shall extend more than 5 miles beyond the bow without approval from Tower. Maintaining a proper and uniform interval is very important in the CARQUAL pattern. Interval is primarily the responsibility of the pilots during VMC; however, both the Air Boss and the LSO shall monitor the pattern and issue instructions to adjust the interval as necessary.

5. Once wings level on downwind, the pilot shall descend to 600 feet and commence the landing checks.

6. The abeam position is .8 to 1.0 DME at 600 feet. Landing checks should be complete to include antiskid and external lights off, 50° to 60° nozzles, and 10 to 12 units. The pilot shall transmit "Call sign, abeam, gear, fuel state, wet or dry." Tower or Paddles shall respond with "Expect spot ___" or "Expect heavy waveoff." Winds will only be repeated from the break if they are significantly different. For a heavy waveoff, Paddles will transmit "Check water off " if conservation of water is crucial.

**WARNING**

For all shipboard operations, the antiskid switch must be in NWS to preclude loss of brakes and unwanted nosewheel castering.

**Note**

- If the pilot feels sufficient water is not available for a landing that requires water, a water quantity call shall be included in the abeam call.

- Do not transmit with another aircraft in the groove until that aircraft has landed.

7. The turn off the 180 should be an instrument-type turn of 20° to 25° angle of bank to arrive at the 90 at 400 to 450 feet and 10 to 12 units.

8. The altitude in the groove shall be 300 to 350 feet. The proper groove length is one-half to three-quarters nm. The timing for headwinds is as follows:

   a. Greater than 20 knots — Turn prior to abeam the intended landing spot.

   b. Ten to 20 knots — Turn abeam the intended landing spot.

   c. Less than 10 knots — Delay 2 to 4 seconds past abeam.

9. The pilot shall intercept and fly a 3° glideslope to abeam the landing spot. The OLS can be used to reference a 3° glideslope but is only giving valid information while within a 20° cone centered about the OLS itself. The pilot shall transmit "Hover stop" after hover stop selection. Paddles shall reply with "Spot _____" or "Foul deck," or "Expect heavy waveoff."

10. An offset approach is typically used for Case 1 recoveries although over-the-stern approaches may be conducted when circumstances dictate. For offset approaches, the pilot shall decelerate down the port side of the ship one plane width from the edge of the ship.

11. The deceleration closure rate should allow the aircraft to be stopped in a controlled manner abeam the landing spot. Typically, Paddles will clear the pilot to cross early if the closure rate is under control. In this case, the pilot shall not cross until at a 45° position off the landing spot. Except for lost communication approaches, pilot shall not cross until Paddle transmits "Cleared to cross."

**Note**

Use of braking stop during the declaration requires an additional 2- to 3-percent rpm and increases pilot workload. Pilots shall not rely on braking stop to salvage a poor pattern.

12. The altitude abeam the landing spot shall be as follows:

    a. LHD — 120 feet.

    b. LHA — 120 feet.

    c. CV/CVN — 120 feet.

    d. LPD — 100 feet.

13. A level cross at 50 feet above the deck directly to the landing spot shall be conducted.

**Note**

The radar altimeter shall be used in the landing pattern. If the radar altimeter is inoperable, the pilot shall set the altimeter to read 70 feet on the deck of an LHD/LHA and 50 feet on an LPH.

14. Once cleared to land, the pilot shall strive to place his head over the intended landing spot. The aircraft shall normally be lined up on the tramline for landing; however, if the pilot is uncomfortable with the winds, the nose of the aircraft may be

aligned with the wind. In this case, the pilot shall strive to place the main gear of the aircraft on the tramline.

**Note**

The wind vane is an unreliable indicator during landing because of turbulence from the island.

15. When cleared to land, Paddles will call "Cleared to land" and "Idle" at touchdown.

16. "Check" calls shall be used by Paddles to position the aircraft over the landing spot. If given a check call, the pilot shall stabilize, move the aircraft 10 feet, and continue with the landing. If given a second check call, the aircraft shall be moved another 10 feet and the landing continued. On the third check call, the aircraft shall be moved until Paddles calls "Stabilized."

17. Upon touchdown, reduce power to idle, apply the brakes, select nozzles aft and water switch off (if used), and follow the plane director's signals.

18. After landing, movement of the aircraft shall be controlled by the taxi director (yellow shirt).

19. The Day Case 1 pattern is depicted in Figure 6-4.

**6.3.3 Night Case 1 Procedures.** The Night Case 1 procedures are as follows:

1. If departing marshal through an overcast, the pilot shall comply with the departing marshal instructions (Paragraph 6.2.5) until VMC is reached. At that time, the pilot shall report "Canceling IFR" and proceed directly to the initial.

2. The pilot shall report "See you" when Mother is in sight.

3. The initial is 800 feet, 3 NM astern. The pilot shall strive to be at the initial in order to meet the Charlie time and set state (from the initial to crossing the deck edge requires approx. 4 minutes and 400–500 lbs fuel). The initial shall be reported to the Tower. Tower shall transmit "Winds are _____", "Continue" or "Cleared to break".

4. The pilot shall fly up the starboard side of the ship for a level 800 ft. break. The break shall not be conducted unless cleared by Tower and no earlier than 10 seconds past the bow. No aircraft shall extend more than five miles beyond the bow without prior approval from Tower. Interval is primarily the responsibility of the pilots during VMC: however, both the Air Boss and the LSO shall monitor the pattern and issue instructions to adjust as necessary.

**Note**

Single-ship and section breaks are authorized. Due to the slower deck handling procedures at night and to enhance pilot and LSO situational awareness, consideration should be given to single-ship recoveries with two minute intervals. For section recoveries, interval should be a minimum of 30 seconds.

5. Once wings level on downwind the pilot shall commence the landing checks.

6. The abeam position is 1.0 to 1.3 DME at 800 feet. Landing checks should be complete to include antiskid off, 50-60 nozzles, and 10 to 12 units. The anti-collision light should be on, position lights dim, and the formation lights on with the external lights master switch in the NVG/NVD position. The pilot shall transmit "Callsign, abeam, gear, fuel state, wet or dry." Tower or Paddles shall respond with "Expect spot _____" or "Expect heavy waveoff." Winds will only be repeated from the break if they are significantly different. For a heavy waveoff, Paddles will transmit "Check water off" if conservation of water is crucial.

**WARNING**

For all shipboard operations, the anti-skid switch must be in NWS to preclude loss of brakes and unwanted nosewheel castering.

**Note**

- If the pilot feels sufficient water is not available for a landing that requires water, a water quantity call shall be included in the abeam call.

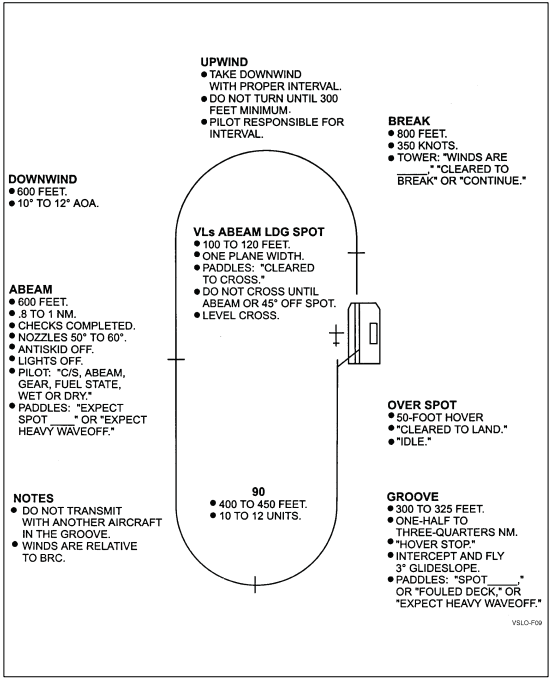


Figure 6-4. Day Case 1 Pattern

- Do not transmit with another aircraft in the grove until that aircraft has landed.

7. The 180 position is 1.5 to 1.7 DME at 800 feet and 10 to 12 units. The turn off the 180 should be an instrument type level turn of 20–25° angle of bank to arrive at the 90 at 650 feet. From the 90 the turn should be descending to arrive in the groove at 1.3 to 1.5 DME and 500–550 feet.

8. The pilot should intercept and fly a 3° glideslope to abeam the landing spot. The OLS can be used to reference a 3° glideslope but is only giving valid information within a 20° cone centered about the OLS itself. Once the source and datums are clearly visible, the pilot shall transmit "(Callsign), harrier Ball". Paddles shall respond with "Roger Ball". If the ball is not in sight by 400 feet, the pilot shall transmit "Clara".

**Note**

Night Case 1 recoveries may not require the use of the OLS if it degrades visual interpretation of the landing environment.

9. An offset approach shall be used for Case 1 recoveries. The pilot shall decelerate down the port side of the ship one plane width from the edge of the ship.

10. Hover stop should be selected at .5 to .8 DME depending on the winds. The pilot shall transmit "Hover stop". Paddles shall respond with "Spot _____" or "Fouled deck". The deceleration closure rate should allow the aircraft to be stopped in a controlled manner abeam the landing spot. Typically, Paddles will clear the pilot to cross early if the closure rate is under control. In this case, the pilot shall not cross aft of the 60° bearing relative to the landing spot. Except for lost communication approaches, the pilot shall not cross until Paddles transmits "Cleared to cross".

**CAUTION**

Crossing forward of the 45° bearing or overshooting the landing spot may result in increased pilot workload.

**Note**

Use of braking stop should be avoided.

11. The altitude abeam the landing spot shall be 120 feet for LHA/LHD operations.

12. Execute a level cross at 50 feet above the deck directly to the landing spot. The HPI and tramline should be referenced to place the aircraft in a proper hover position above the landing spot. Once over the landing spot, Paddles shall transmit "Cleared to land". After touchdown, exterior lights shall be extinguished except for the formation lights in accordance with paragraph 4.13.

**CAUTION**

Closure and rates of descent are initially more difficult to discern and may cause late recognition of aircraft trends. use of NVG/NVDs by the LSO for aircraft in close is not recommended.

**Note**

Alternate landing spots may be used in an emergency or as necessary for general safety.

13. The Night Case 1 pattern is depicted in Figure 6-5.

## 6.4 CASE 2 RECOVERY

**6.4.1 Case 2 Defined.** Case 2 recoveries are conducted when weather is 1,000/5 or better but less than 3,000/5. During a Case 2 recovery, an instrument approach is conducted in order to reach VMC underneath. Case 2 recoveries shall be conducted under procedural or positive radar control until VMC is obtained. Case 2 recoveries are conducted during the day or during NVD recoveries.

**6.4.2 Case 2 Recovery Procedures.** Close control shall be used by AATCC/HDC until the pilot reports "See you," at which time, normal Case 1 procedures shall be followed. If the first flight is unable to gain and maintain visual contact with the ship at the 12-mile gate, a controlled descent to 800 feet daylight/1000 feet night aided shall be initiated at the gate. If less than Case 2 weather exists at 5 miles, the

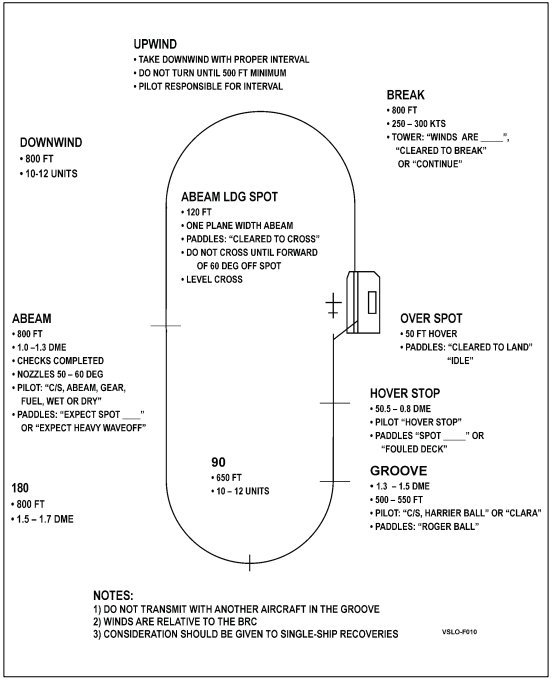


Figure 6-5. Night Case 1 Pattern (Aided)

first flight shall be vectored into the waveoff pattern and to Case 3 marshal. Subsequent aircraft shall be recovered as Case 3 approaches.

**Note**

During night aided operations consideration should be given to recovering as singles if the ceiling is less than 2000 feet.

## 6.5 CASE 3 RECOVERY

**6.5.1 Case 3 Defined.** Case 3 recoveries are conducted when the weather is less than 1,000/5 or during night unaided recoveries. A Case 3 recovery is an instrument approach to a full stop or low approach to enter the Case 1 CQ pattern. Case 3 recoveries shall be conducted under procedural or positive radar control until the pilot assumes visual control.

**6.5.2 Case 3 Recovery Procedures.** The standard Case 3 recovery should consist of a TACAN approach to a PAR or needles approach on final. The procedures for departing marshal as discussed in paragraph 6.2.5 shall be complied with. If the TACAN is unavailable, Center shall provide radar vectors to a PAR or needles approach.

**Note**

The pilot shall select the APU on for all Case 3 and night recoveries and set the radar altimeter to 400 feet.

1. The pilot shall arrive at the gate, which is defined as 1,200 feet at 12 DME astern on the BRC. If the BRC is not intercepted prior to 12 DME, the pilot shall arc at 12 DME until intercepting the BRC. The pilot shall transmit "Gate" and commence landing checks.

2. Frequency changes shall be made only during level flight. Prior to the FAF, Center shall switch the aircraft to the final controller/Paddles frequency.

3. The FAF is 1,200 feet at 5 DME on the BRC for all instrument approaches. Prior to the FAF, all landing checks shall be completed to include 50° nozzles and water checks. Except when conducting a PAR or ASR approach, the pilot shall transmit "Final approach fix, gear." During a PAR or ASR approach, the final controller will initiate the "Gear" call. At 2 DME, select 60° nozzles.

4. When conducting an instrument approach, the following altitudes are recommended:

   a. 3 DME — 1,000 feet AGL.

   b. 2 DME — 700 feet AGL.

   c. 1 DME — 400 feet AGL.

**WARNING**

The pilot shall not fly below 400 feet until the ball is in sight during a night approach. If the ball is not in sight by 400 feet, the pilot shall transmit "Clara" and level off.

5. For aided Case 3 approaches, the decelerating transition shall be conducted parallel to the BRC, offset to port. The pilot shall not offset before the transition to the OLS ("Ball" call).

**CAUTION**

Interpretation of the OLS may be degraded when viewed aided. Under certain environmental conditions the LSO should consider Case 3 unaided recoveries.

**6.5.2.1 V/STOL Optical Landing System.** Visual glideslope and trend information during the final portion of the Case 3 approach is provided by the V/STOL OLS. The V/STOL OLS is mounted above the deck on the aft end of the island and is deployed aboard LHD and LHA class ships only. Pitch and roll stabilization compensates for as much as 3° of ship pitch and 14° of roll. Figure 6-6 illustrates the V/STOL OLS display indications.

When the amber ball (referred to as the source) is lined up with the two green datum bars (referred to as the datums), the pilot is on the proper glideslope. The V/STOL OLS is set for a 3° glideslope to bring the pilot to the ship ramp at approximately 50 feet above the deck. The tramline will be referenced for lineup.

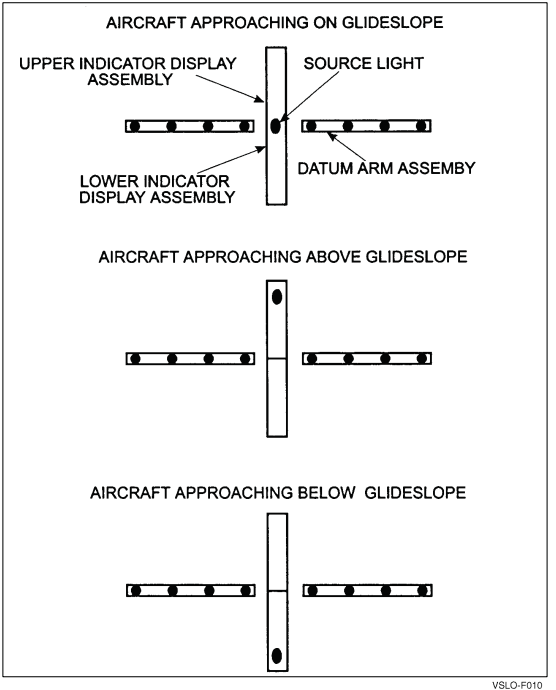


Figure 6-6. V/STOL Optical Landing System Display

Figure 6-7 illustrates the orientation of the 20° horizontal coverage of the V/STOL OLS. The display is oriented so the pilot will lose the V/STOL OLS display at the ramp. At this point, the pilot shall transition to the HPI or take over visually.

The V/STOL OLS vertical indicator display is light coded as illustrated in Figures 6-8 and 6-9. The source will go from a normal amber brightness to a brighter amber, then to a flashing amber as the ball goes off the top, then to a nonflashing red, and then a flashing red as the ball goes off the bottom.

The ball shall not be flown until the source and the datums are clearly visible (1 to 2 nm). At this point, the pilot shall transmit, "Call sign, ball, fuel state, wet or dry." After the ball call, Paddles will accept control of the recovery and shall respond with,"Roger ball, winds are _____, (ship's speed)." The pilot shall ensure 60° nozzles have been selected at the ball call.

**6.5.2.1.1 V/STOL Optical Landing System Failure.** If the V/STOL OLS fails during night recoveries, consideration shall be given to diverting the aircraft. If diverting the aircraft is not possible, the pilot shall fly a Case 3 approach to 1 nm astern the ship. At this point, the LSO shall assume positive control and "talk" the pilot to a recovery at the standard landing spot.

**6.5.2.2 Horizontal Approach Path Indicator.**The two HAPI lights are pitch and roll stabilized and mounted in the port catwalk. As illustrated in Figure 6-10, each HAPI provides a two-color display that is a steady white light or red light depending on whether the approaching pilot is above or below the basic angle setting of the units. The pilot will maintain a proper approach within the prescribed corridor if the forward light is red and the aft light is white. If the pilot sees red over red, the aircraft is below the required approach corridor. If the pilot sees white over white, the aircraft is above the required approach corridor.

**Note**

The HAPI should not be used as the primary reference for glideslope because of the larger tolerances on the glideslope associated with the system.

**6.5.2.3 Hover Stop.** Hover stop shall be selected at .5 to .8 DME depending on the winds. The pilot shall transmit "Hover stop." Paddles shall respond with "Spot _____."

**Note**

Use of braking stop during the deceleration requires an additional 2- to 3-percent rpm and increases pilot workload. Pilots shall not rely on braking stop to salvage a poor pattern.

**6.5.2.4 Hover Position Indicator.** The HPI is mounted on the aft end of the island below the OLS. It consists of a vertical group of five lights and a horizontal group of three lights. A single red light is mounted 9 feet in front of the plane of the other lights. The apparent location of the red light relative to the other lights gives the pilot a location cue in the hover and through the vertical descent to a landing. In the final phase of the recovery, the pilot lines up on the ship tramline and flies forward until the red light is centered in the display as shown in Figure 6-11. When this occurs, the pilot is over the touchdown zones with his eye approximately 50 feet over the deck. As the pilot descends vertically to a touchdown, the HPI provides a relative idea of the rate of closure with the deck as the red light apparently passes through the vertical white lights.

**CAUTION**

The HPI is not pitch or roll stabilized.

**6.5.2.5 Primary Landing Spots — Night Approach.** The primary landing spots for a night approach are as follows:

1. LHD — 7.
2. LHA — 7.5.

Once over the landing spot, Paddles shall transmit, "Cleared to land." After touchdown, external lights shall be selected off at night.

An illustration of the standard Case 3 recovery is depicted in Figure 6-12.

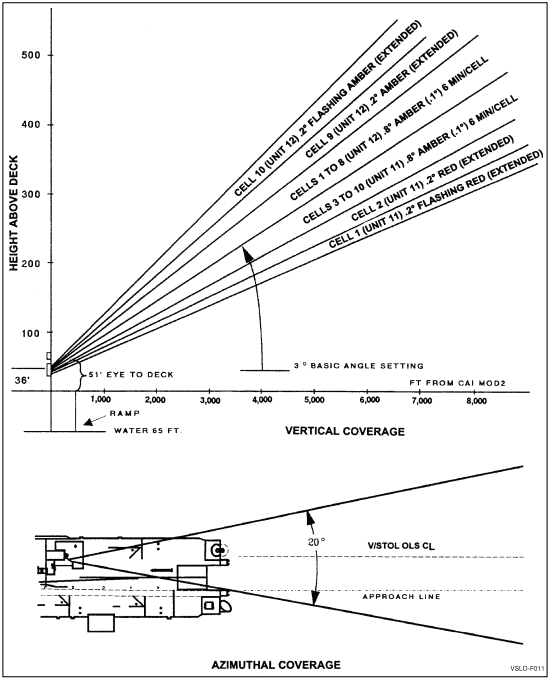


Figure 6-7. V/STOL Optical Landing System Vertical and Azimuthal Coverage

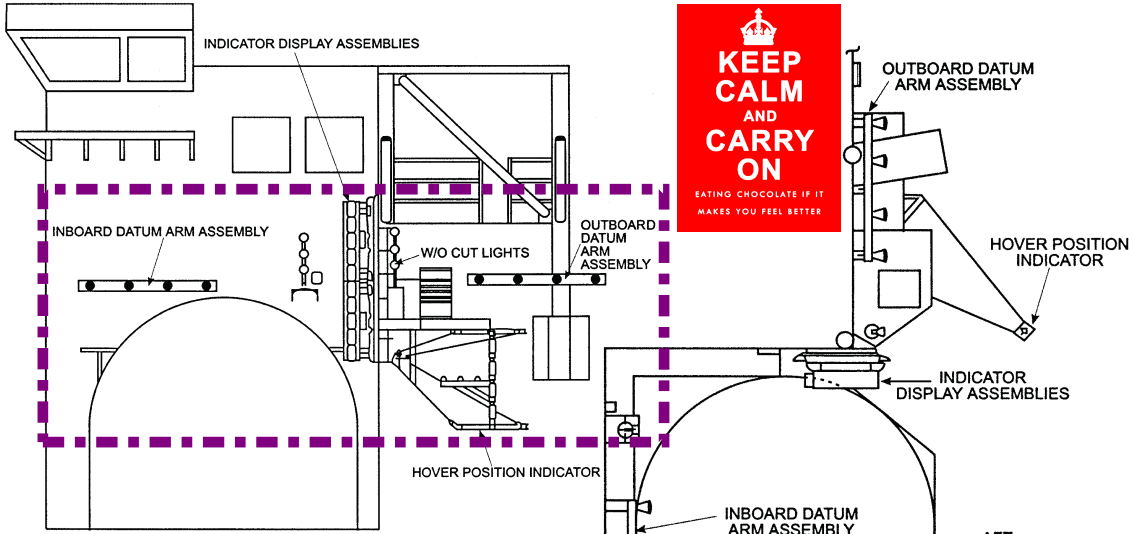


Figure 6-8. Elevation View of V/STOL Optical Landing System Mounted on LHA Class Ship

Figure 6-9. Plan View of V/STOL Optical Landing System Mounted on LHA Class Ship

VSLO-F013

1. RED ZONES ARE VISIBLE TO THE HORIZONTAL

2. WHITE ZONES ARE VISIBLE TO 9°.

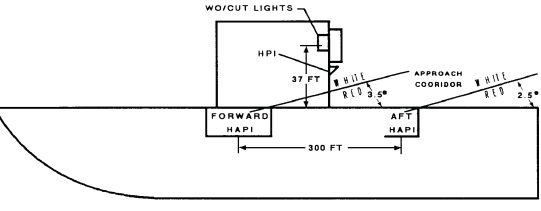


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Figure 6-10. Horizontal Approach Path Indicator Vertical Presentation, Typical Installation

## 6.6 CASE 3 DAY RECOVERY PROCEDURES

The Case 3 recovery procedures covered in paragraph 6.5 shall be used for a Case 3 day recovery with the following exceptions:

1. An offset approach to the port side of the ship rather than over the stern may be used.
2. If a V/STOL OLS is not available, the pilot shall transmit "See you, fuel state, wet or dry" rather than the ball call once visual contact with the ship is made.

## 6.7 INSTRUMENT APPROACHES

The following instrument approaches may be utilized for Case 3 recoveries.

**6.7.1 Precision Approach Radar/Air Surveillance Radar.** The PAR and ASR approach procedures aboard ship are identical to the standard PAR/SAR approaches conducted at any naval or Marine Corps air station except for azimuth corrections on final that are given in degrees right or left vice an actual heading (e.g., "2° right" vice "Right to 2 2 5°"). The PAR/ASR minimums are published on the TACAN approach plates.

**6.7.2 TACAN.** Three TACAN approaches are available:

1. Straight in — The approach plate is depicted in Figure 6-13.
2. Overhead — The approach plate is depicted in Figure 6-14.
3. Modified overhead — To be utilized only during shoreline restricted operations. The approach plate is depicted in Figure 14-3.

**6.7.3 Instrument Controlled Landing Systems.** If an ICLS is available, the following procedures will be used:

1. Approaching the FAF, the pilot shall transmit "Needles" and the position of the needles relative to the aircraft (e.g., "Call sign, needles, up and right").
2. If the final controller determines the ICLS information to be inaccurate, the pilot shall be told to "Disregard the needles" and continue with a PAR/ASR or TACAN approach.

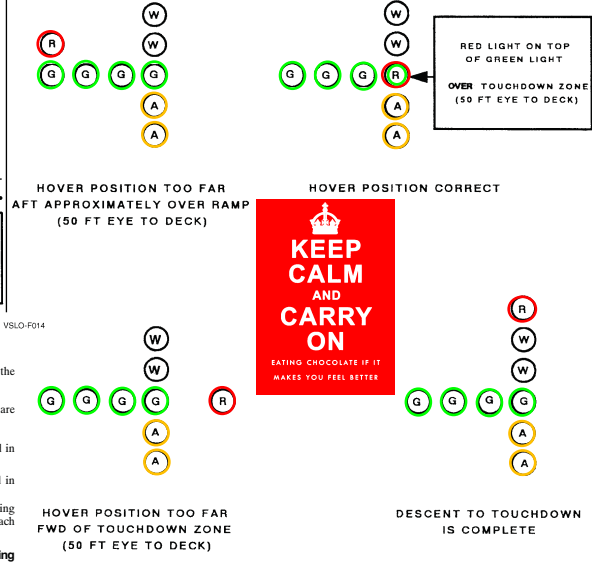


Figure 6-11. Hover Position Indicator Display