

IN-FLIGHT

Refer to Section IV.

A4E/F/G NATOPS

BRAKING TECHNIQUES

Brake pedals should be pumped on final approach to ensure a firm brake pedal after touchdown. As a general technique, a steady pedal pressure should be applied and maintained during landing rollout. Brake pedals should be released and reapplied only as necessary to hold firm pedal pressure and position.

CAUTION

The improved capacity of the dual disc brakes (all A-4F aircraft; all A-4E aircraft after rework per A-4 AFC 272) makes it possible to lock the wheel brakes at any speed, causing a tire to blow.

Proper braking technique for a minimum distance landing roll requires moderate brake pedal pressure, without skidding tires, as soon as aircraft weight is firmly on the main wheels. Brake pressure must then be increased as the aircraft decelerates because aircraft weight on the tires increases as wing lift decreases, assisting braking effort.

The wing lift spoilers, when extended with full flaps, reduces wing lift by almost 84 percent and minimizes aircraft weight change on the tires as the aircraft decelerates. Therefore, brakes may be applied as soon as the spoilers are extended, with a moderately heavy pressure that will be slightly increased as the aircraft speed decreases.

NOTE

The maximum braking technique will not be used for normal field landings where adequate runway exists for the aircraft to decelerate below 80 KIAS before applying brakes.

LANDING

The flight shall normally approach the breakup point in echelon, parade formation, at 250 to 300 KIAS. A 3- to 5-second break will provide an adequate downwind interval. Immediately after the break, extend speedbrakes and retard throttle to 70 percent. Speedbrakes will normally remain extended throughout approach and landing. (Speedbrakes increase the stalling speed approximately 1 knot.)

As the aircraft decelerates to 225 KIAS or less, lower the landing gear and extend full flaps. As the airspeed decreases to 170 KIAS, adjust power to maintain desired pattern airspeed commensurate with gross weight. Complete the landing checklist (figure 3-4) and check wheel brakes prior to reaching the 180-degree position. Cross-check airspeed with AOA indexer indication. At a gross weight of 14,000 pounds, recommended approach speed is approximately 125 KIAS at the abeam position (figure 3-6). Optimum AOA indication is 17 1/2 units.

NOTE

For each 1000-pound increase over 14,000 pounds, optimum approach speed (determined by the AOA indexer) increases approximately 5 KIAS.

If a discrepancy between indexer and airspeed exists, recheck landing configuration and gross weight and approach at recommended airspeed. Report error in AOA calibration.

Begin the turn into the base leg at a point slightly downwind of the landing end of the runway in order to have adequate straightaway for corrections on final. Optimum angle-of-attack approaches to touchdown will be made. Where a mirror is available, its use is recommended. Attempt to control meatball, lineup, and angle-of-attack/airspeed as precisely as for a carrier approach in order to maintain proficiency in this technique.

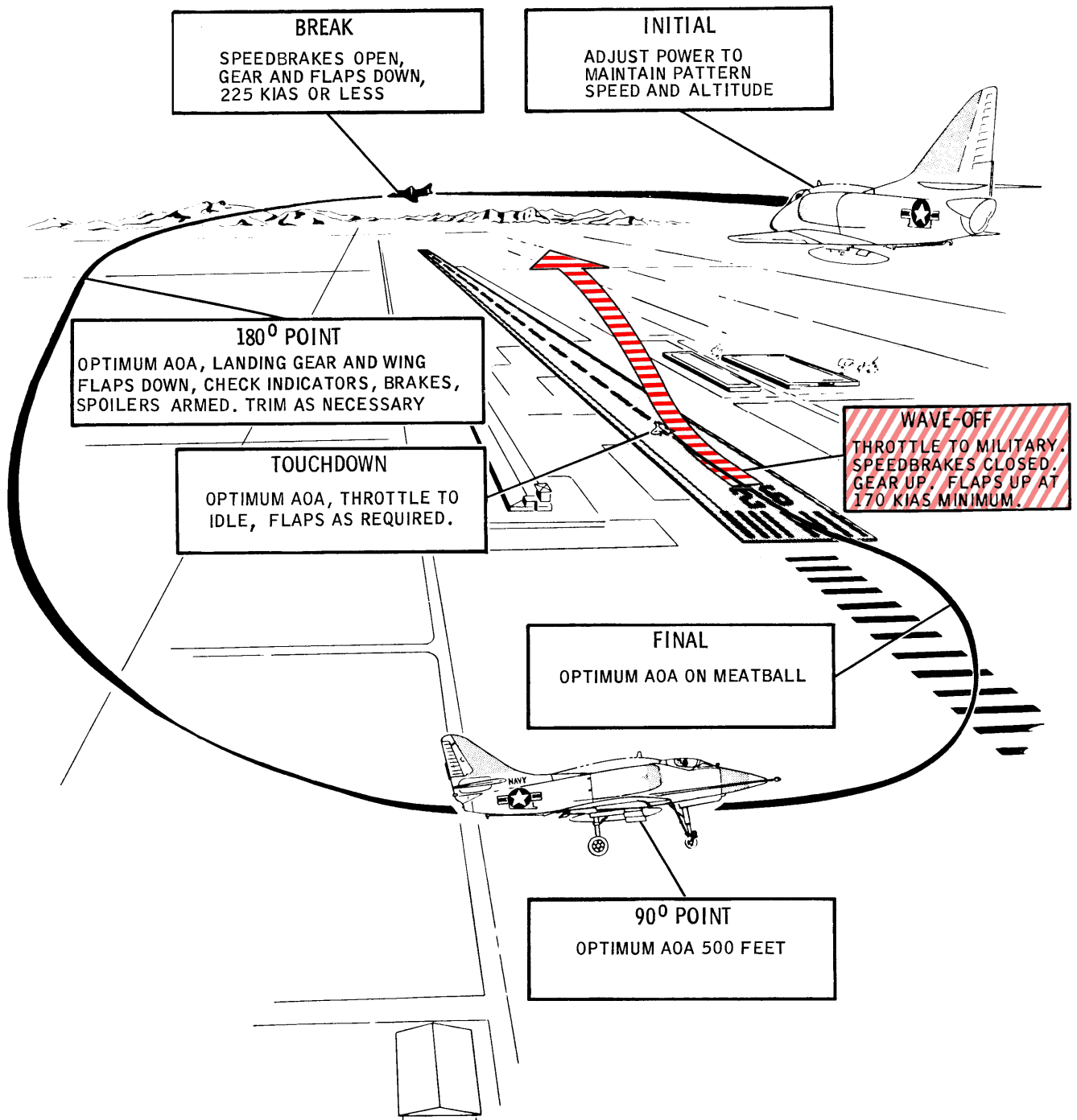
Upon touchdown, the following technique is recommended:

1. Power to IDLE
2. Flaps as required by landing conditions.
3. After touchdown apply full forward stick deflected into the wind as necessary to maintain a wings level attitude. Apply rudder as required to maintain directional control.
4. Use brakes as necessary.
5. As rudder becomes ineffective, use brakes for directional control.
6. Below 60 KIAS, nosewheel steering may be used for directional control. (All A-4F.)

Prior to turning off the runway, aircraft speed must be slowed to about walking speed. ON A GO-AROUND, WAVEOFF, OR TOUCH-AND-GO, DO NOT RAISE LANDING GEAR UNLESS LEAVING PATTERN.

NOTE

REFER TO LANDING DISTANCE CHARTS
IN SECTION XI FOR FINAL APPROACH
AND TOUCHDOWN SPEEDS.



GG1-24-B

Figure 3-6. Landing and Waveoff Patterns

Changed 1 March 1970

Crosswind Landing

CAUTION

Crosswind landings are not recommended with a 90-degree crosswind component in excess of 25 knots. During the approach, maintain wing down into the wind and opposite rudder, as required, to maintain lineup. At touchdown, the aircraft alignment should be straight down the runway with no drift. After touchdown, under maximum crosswind components or less, the aircraft can easily be controlled directionally by applying aileron into the wind and using wheel brakes as required. If the upwind wing is allowed to rise, the nose of the aircraft will tend to track toward the downwind side rather than "weather-cocking" into the wind as is normally expected. If strong crosswinds exist, land on the upwind side of the runway. The following procedure is recommended immediately after touchdown.

1. Reduce power to IDLE.
2. Maintain stick deflection into the wind as required and allow nose of aircraft to fall through. When nosewheel is on deck, apply full forward stick deflected into the wind as required to maintain a wings level attitude.
3. Raise the flaps to further reduce wing lift.
4. Extend speedbrakes to shorten landing roll if not already extended.
5. Use wheel brakes as necessary, but do not skid the tires.
6. Below 60 KIAS, nosewheel steering may be used for all directional control. (All A-4F.)

NOTE

Effectivity: All A-4F aircraft.

Ensure that rudder is centered prior to engagement of nosewheel steering.

During a crosswind landing with the power boost disconnected, increased control stick pressures and reduced control sensitivity make the landing extremely hazardous. If the crosswind component exceeds 8 knots, it is recommended that the field arresting gear be used.

- Maximum recommended crosswind component is 15 knots at 90 degrees when spoilers are unavailable (loss of utility hydraulic pressure, on emergency generator power, etc.)
- At high values of 90 degrees crosswind component (20 to 25 knots), wind gusts become more prevalent and close attention must be paid to lateral control, particularly when landing with asymmetric store loadings.

NOTE

With any asymmetrical load, the maximum permissible crosswind component under the loaded, or heavy wing, is 15 knots without spoilers and 25 knots with spoilers open.

Minimum Distance

To accomplish a minimum distance landing, the following procedure is recommended:

1. Maintain optimum angle-of-attack during approach.
2. Upon touchdown, let the nose fall through and use full forward stick.
3. Leave the flaps fully extended unless there is excessive crosswind.
4. Apply moderately heavy braking immediately after the nosewheel is on the runway.
5. Maintain steady braking throughout the rollout to a stop or desired taxi speed, increasing brake pedal pressure as the speed decreases.
6. Landing roll.
 - a. If circumstances dictate, the landing roll may be further reduced by shutting down the engine upon touchdown. (All A-4E.)
 - b. If circumstances dictate, the landing roll may be further reduced by shutting down the engine at 80 KIAS. (All A-4F.)

NOTE

Spoilers will close after engine shutdown.

Securing Engine

The following steps will be performed prior to shutdown:

1. Flaps UP
2. Speedbrakes IN
3. Spoilers CLOSED
4. Horizontal stabilizer trim ZERO DEGREES
5. Drop tank switch OFF
6. Radios and all electrical equipment OFF
7. Gear pins, ordnance pins and chocks IN PLACE
8. Ejection control safety handle DOWN
9. Check oil level by depressing OIL LOW indicator/switch (if installed). If light comes on, oil level is below 80 percent and must be serviced.

NOTE

Except for an emergency or operational necessity, when engine has been operated at or above 85 percent rpm for periods exceeding 1 minute, within 6 minutes prior to shutdown; the engine should be operated at IDLE for 30 seconds prior to shutdown to prevent overheating the rear bearings.

10. INT/EXT power switch . . . EXT (Plane captain)

NOTE

In aircraft equipped with underfrequency protector (A-4 AFC 338), step 10 need not be performed.

11. With engine stabilized at IDLE, throttle OFF
12. Time engine rundown. Be alert for unusual compressor noises.
13. Oxygen OFF

FIELD CARRIER LANDING PRACTICE (FCLP)**Pattern-Entry Procedure****INDIVIDUAL ENTRY**

Call the tower for entry to the FCLP pattern. Request 800-foot break altitude. Otherwise, follow the normal field entry procedures into the break. When cleared to break and the proper interval of the aircraft downwind is assured, roll into a 45-degree banked turn.

Reduce power to 70 percent and extend speedbrakes. Speedbrakes will normally remain out throughout the approach and landing. Use of speedbrakes may not be desirable at high gross weights (in excess of 13,000 pounds) when configured with high drag stores, i.e., buddy store, MBR's, etc, due to the high thrust required during the approach. At 225 KIAS, lower gear and full flaps. Adjust angle of bank to provide correct distance abeam (1 1/4 miles). Descend to 600 feet AGL on the downwind leg. Pilots shall crosscheck airspeed against angle-of-attack indexer to ensure calibration of indexer prior to turning from the 180-degree position.

FORMATION ENTRY

The leader of the formation will enter the break as described above for single-aircraft entry. When cleared to break, the leader will give the breakup signal and execute a break by rolling into a 45-degree banked turn. The remaining aircraft in the formation will take a 10-second break interval.

Pattern**DOWNWIND**

Maintain 600 feet AGL at a comfortable airspeed, but no faster than 150 KIAS. Complete landing checklist.

180-DEGREE POSITION

Altitude should be 600 feet AGL. Plan to lose sufficient airspeed on the downwind leg to arrive at the 180-degree position at the optimum angle-of-attack or approach speed. The approach airspeed will vary with aircraft gross weight. Distance abeam will vary with wind conditions, but 1 1/4 miles abeam

is a normal position. The turn from the 180-degree position will be delayed so as to intercept the glide-slope, wings level at 600 feet AGL.

90-DEGREE POSITION

Altitude should be 600 feet AGL with the aircraft at optimum angle-of-attack/airspeed.

FINAL

When the "meatball" appears in the center of the mirror, it will be necessary to reduce power slightly and ease the nose over, maintaining optimum angle-of-attack/airspeed. Proper glide slope and approach speed are maintained by keeping the "meatball" centered by coordinated adjustments of power for altitude corrections, and of attitude for airspeed corrections. The straightaway, with winds level, should be about 1-1/2 miles long.

Once the "meatball" is sighted, the approach should be monitored by cross-checking MEATBALL, LINEUP, ANGLE-OF-ATTACK INDEXER/AIRSPEED. Make necessary corrections immediately but smoothly.

LANDING

Keep the aircraft on the glide slope and centerline. Keep the "meatball" centered until touchdown. Do not flare. Upon touchdown, add full power and retract speedbrakes immediately. Climb straight ahead until reaching at least 300 feet and 150 KIAS. Turn downwind when the aircraft ahead is approximately in the 10 o'clock position on the downwind leg. Do not exceed 150 KIAS in the pattern. About 30-degree angle of bank turning downwind should establish the correct distance abeam. Extend speedbrakes on the downwind leg prior to reaching the 180 degree position.

WAVEOFF

To execute a waveoff, immediately add full power, retract speedbrakes, and transition to a climbing attitude to prevent further loss of altitude. Make all waveoffs directly down the runway until at least 300 feet of altitude and 150 KIAS are attained.

NIGHT FLYING

Flight Procedures

See section IV.

Night Lighting Doctrine Shore-Based Operations

LINE AREA

CAUTION

With external lights on BRT, application of external power or starting the aircraft may cause failure of the lights. Allow 60 seconds for warmup after electrical power is applied to aircraft.

Prior to start, turn wing and tail lights to STDY/DIM and all others to OFF. This is the minimum lighting condition that should be used whenever the engine is running. Turn the master exterior lights switch ON, so that when the engine starts the exterior lights will come on. Perform customary poststart checks, including exterior lights check. Signal the plane captain when ready to taxi by flashing the exterior lights. Taxi in the line area with fuselage and anticollision lights OFF and remaining navigational lights DIM.

TAXIING

Once clear of the line area, turn lights to BRT/FLSH.

The taxilight should be utilized whenever the field lighting is insufficient for safe ground operations. Discretion is required, since night vision may be impaired.

WARNING

Utilization of the taxilight while airborne may destroy night vision and cause disorientation.

AT APPROACH END OF RUNWAY

While completing the takeoff checklist in the turnup area, keep all lights BRT/FLSH unless other aircraft are in the turnup area, in which case it may be necessary to dim all lights to prevent pilots of other aircraft from losing their night vision.

It may be necessary to modify the above procedure to conform to local operating procedures.

PART 4

CARRIER-BASED PROCEDURES

GENERAL

The CVA/CVS and LSO NATOPS manual is the governing publication for carrier-landing operation.

CAUTION

Taxi with flaps fully retracted.

DAY OPERATIONS

Preflight

Preflight, start, and poststart checks shall be accomplished in accordance with section III, part 3, with the following additions:

1. Record the expected gross weight of the aircraft for catapult launch in the designated area.
2. Ensure that the tension-bar retainer clip is installed securely and is in good condition.
3. Note the relationship of arresting hook to deck edge. Do not lower hook during poststart checks unless hook point will drop on the flight deck.

Poststart

1. Engines will normally be started 10 to 15 minutes prior to launch, and the customary functional checks will be performed.
2. The canopy will be either open or fully closed and locked. It should be closed when necessary to prevent damage from wind or jet blast.
3. Set emergency-jettison select switch to appropriate position prior to launch.

Taxi

WARNING

Spoilers shall be dearmed during shipboard operations because of potential hazard to flight deck personnel.

1. Taxiing aboard ship is generally similar to that on land, with some variation of power required due to increased wind and turbulence and decreased braking effectiveness because of higher tire pressures. Particular attention should be given to keeping speed under control.

2. While taxiing with appreciable wind over the deck, pilots should avoid attempts to turn large angles to the relative wind or to the jet blast of another aircraft. However, it is imperative that the director's signals be followed closely at all times.

3. Under high wind conditions, directional control is sometimes difficult. Primary control for taxiing will be nosewheel steering augmented by brakes. If the nosewheel cocks, add throttle to 70 to 80 percent and use rapid intermittent brake to bounce the nose strut, while moving slowly forward. This should decrease the weight on the nosewheel long enough for it to swivel in the desired direction. If this procedure is not effective, hold brakes, retard throttle to IDLE, and signal for a tiller bar. Normally, under heavy crosswind conditions, a tiller bar and wing walkers should be provided.

WARNING

If a tiller bar is being used, use both brakes together and with equal pressure. Using brakes singly can injure the tiller bar man. Do not use nosewheel steering while tiller bar is on aircraft.

Catapult Launches

Proper positioning on the catapult is easily accomplished by maintaining a slight amount of excess power and using the brakes to control speed. The pilot must anticipate the initial "hold" immediately after the nosewheel drops over the shuttle, followed

by a "come ahead" as the holdback unit is placed on the tension bar. After the nosewheel drops over the shuttle, the pilot must move ahead very slowly to prevent overstressing the tension bar. Upon receipt of the "release brakes" signal from the catapult director, release brakes and immediately increase power to MILITARY. Observe acceleration time and allow engine to stabilize.

NOTE

Wind has a negligible effect on EPR readings.

Recheck the attitude gyro, RMI, engine instruments, trim indicators, and flap setting. Ensure a firm grip on the throttle and catapult handgrip, place your head against the headrest, salute, and wait. Normally, the catapult will fire 3 seconds after the launching officer gives the "fire" signal.

TECHNIQUE

Prior to launch, select the optimum trim settings for the anticipated endspeed and aircraft loading. The control stick, if unrestrained by the pilot, will move to the full aft position at the beginning of the catapult power stroke and return to the trimmed position by the end of the power stroke. The proximity of the control stick handgrip to the pilot, and pilot physical geometry, make it difficult to fully brace the arm while holding the stick in the trimmed position during high acceleration launches. The recommended technique is to cup the hand just aft of the stick and restrain as much arm movement as possible by pressing the arm against the side and/or thigh. As soon as practicable after end of power stroke, grasp the stick in its pretrimmed position (optimum horizontal stabilizer setting) and allow aircraft to rotate to a fly-away attitude with a minimum of fore/aft stick movement. The pilot must avoid any large longitudinal control movements as the aircraft becomes airborne, yet be prepared to make minor attitude corrections as necessary and correct any aircraft wing drop that may occur. An initial attitude of approximately 12 degrees noseup is recommended. Adjust attitude as necessary for climbout; normally this will be about 12 to 14 degrees noseup on the attitude gyro. Cross-check angle of attack, airspeed, and other appropriate instruments. Do not rely solely upon one instrument. Ensure a positive rate of climb. Retract flaps at 170 KIAS minimum.

OPTIMUM TRIM SETTINGS

- 1. Rudder ZERO DEGREES
- 2. Aileron FAIRED
- 3. Horizontal stabilizer:
 - Basic trim at 0 to 10 KIAS excess endspeed:
 - Full flaps 7.5 DEGREES
 - Half flaps 7.0 DEGREES
 - Basic trim at 11 to 40 KIAS excess endspeed:
 - Full/half flaps 6.0 DEGREES

TRIM SETTINGS FOR ASYMMETRICAL LOADINGS.

Asymmetrical bow catapult launches with up to 5120 foot-pounds of static moment are permitted. The following trim and control inputs are recommended for the listed crosswind conditions.

Allowable crosswind (knots)	Required endspeed above minimum (KIAS)	Rudder trim units (away from loaded wing)	Aileron
0 to 5	0 to 3	2	Faired
6 to 10	4 to 6	2	Faired
11 to 17 (max)	7 to 10	3	Faired

NOTE

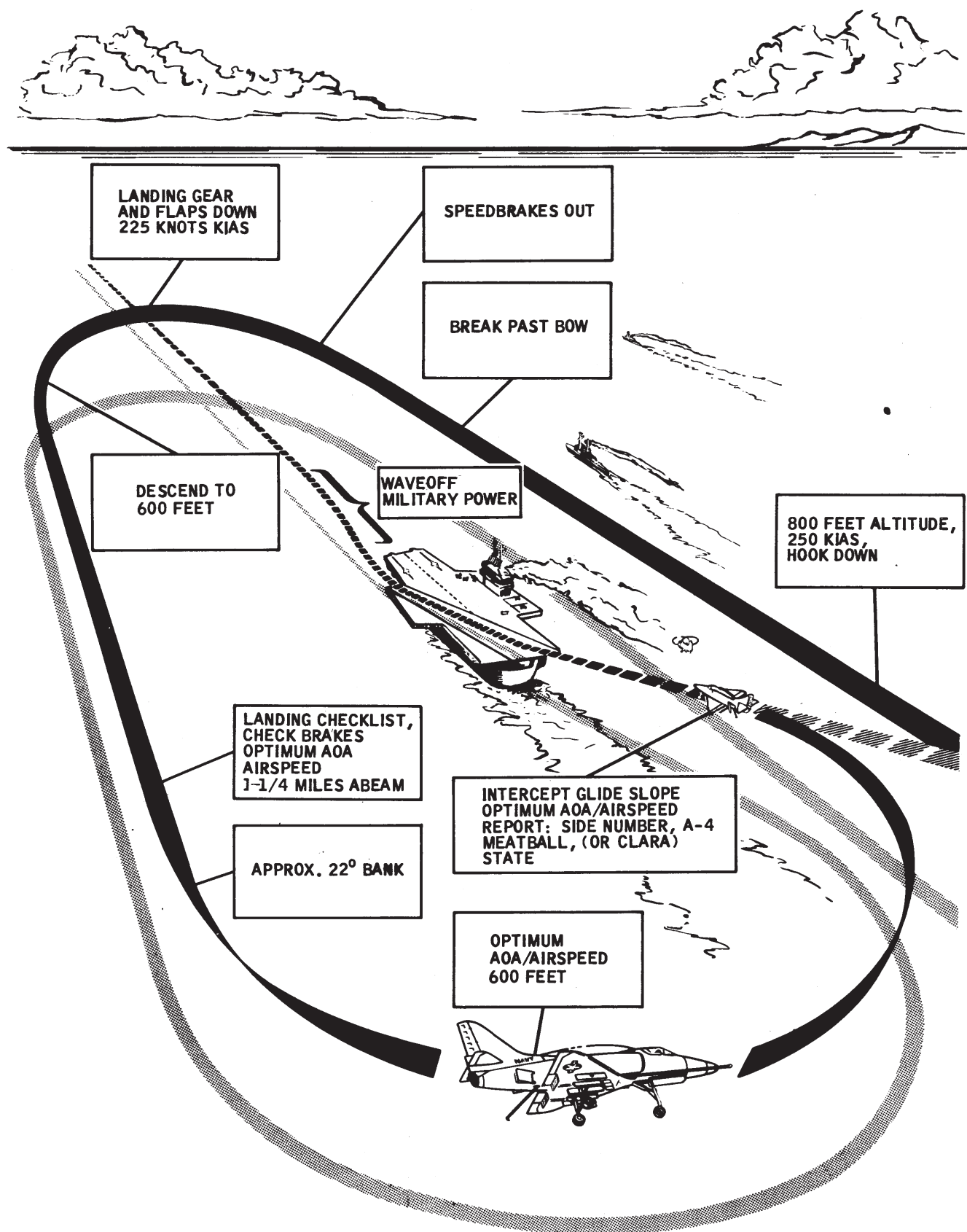
Approximately 5 pounds of lateral stick force is required with 0 to 10 KIAS crosswind and one-quarter to one-half lateral stick deflection is required with 10 to 17 KIAS crosswind to maintain wings level after leaving the bow.

AIRCRAFT OR CATAPULT MALFUNCTION

If, after established at MILITARY POWER, the pilot determines that the aircraft is down, he so indicates to the launching officer by SHAKING HIS HEAD FROM SIDE TO SIDE. NEVER raise the hand into the catapult officer's view to give a "thumbs-down" signal. It is possible that the launching officer may construe the signal to be a salute and fire the catapult. When the catapult officer observes the "NO-GO" signal, he should immediately give a suspend signal. If his response is not immediate, call on land/launch frequency "Suspend, suspend."

Landing Pattern

Under VFR conditions, the formation shall approach the breakup position in right echelon, close aboard the carrier on the starboard side, parallel to the Base Recovery Course (BRC) at 800 feet and 250 KIAS. A minimum straight-in of 3 miles is desired for VFR entry to the break. Aircraft shall be in parade formation with hooks down. Breakup should commence when past the bow and adequate interval on downwind traffic is assured. Normally, a 17-second break interval will establish a 35-second ramp interval. Close adherence to pattern details by all pilots is required for uniform landing intervals. The pattern given in figure 3-7 is recommended. Each pilot shall have the landing checklist completed, be at optimum AOA/approach speed, and have the wheel brakes checked by the 180-degree position. Speedbrakes will normally remain out throughout the approach and landing. Use of speedbrakes may not



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Figure 3-7. Typical Carrier-Landing Pattern

be desirable at high gross weights (in excess of 14,000 pounds) when configured with high drag stores, i.e., buddy store, MER's, etc., due to the high thrust required during the approach.

WAVEOFF

To execute a waveoff, immediately add full power, retract speedbrakes, and maintain optimum attitude. Make all waveoff's straight up the angled deck.

CAUTION

Rotation of the aircraft to an exaggerated nose-high attitude on a waveoff lowers the arresting hook beyond its normal reach and can result in an in-flight engagement. The resulting arrestment can cause damage to the aircraft. Over-rotation on a waveoff can also place the aircraft on the back side of the power-required curve where sufficient power is not available to stop the descent.

Arrested Landing and Exit from the Landing Area

Upon touchdown, advance the throttle to MILITARY and retract the speedbrakes. After arrestment is assured, retard the throttle to IDLE and raise the hook and flaps. The aircraft should be allowed to roll back a short distance after arrestment to permit the hook to disengage from the pendant. Hold both brakes when signaled by the director, apply power (about 70 percent), and engage nosewheel steering (A-4F), in anticipation of the "come-ahead" signal, unless pull-back is indicated by the director. If pull-back is directed, retard the throttle to IDLE, release brakes, and allow the aircraft to be pulled back until a brake signal is received. Then, apply brakes judiciously to prevent the aircraft from tipping or rocking back. Anticipate the "come-ahead" signal by adding power to about 70 percent.

CAUTION

Cross the foul line and follow the director's signals. The usual wind over the deck will give a substantial crosswind component while taxiing on the flight deck. Wing walkers should be provided to assist in leaving the landing area when there is a severe crosswind or wind over the deck exceeding 40 knots. Water, oil, and hydraulic fluid spillages on the flight deck require that caution be exercised in using power and brakes.

Postlanding Procedures

As long as the aircraft is taxiing, the canopy should remain closed and the pilot shall keep his helmet and oxygen mask on. Prior to shutdown, he will open the canopy. If the aircraft is towed or pushed, he shall keep speed slow and under control, and, as noise level is normally high, he must remain alert for either hand or whistle signals from aircraft handling personnel. Whenever the plane director is not in sight, STOP: Do not release brakes until the aircraft has at least an initial tiedown. Plane captains shall not install the access ladder until this has been accomplished.

NIGHT OPERATIONS

Flight Deck

PREFLIGHT

External preflight will be made using a red-lens flashlight. In addition to normal cockpit preflight, ensure that external light switches are properly positioned for poststart exterior lights check. The master exterior lights switch, anticollision light switch, and the taxi light switch should always be in the OFF position prior to start. Wing lights and taillights should be set to BRT/STDY position for the poststart checks. Instrument lights and console lights control should be turned on. Direct cockpit emergency floodlights on instrument panel and kneeboard light as desired.

POSTSTART

Adjust cockpit lights intensity to desired level. After normal systems checks are completed, perform exterior lights check. Place the master exterior lights switch in ON momentarily. Upon completion of exterior lights check, place master exterior lights switch in the OFF position.

TAXI

Slow and careful handling of aircraft by both the plane director and the pilot is mandatory. If the pilot has any doubt as to the plane director's signals; STOP.

CATAPULT LAUNCHES

The difficulty of "getting on" the catapult at night is increased by the fact that it is difficult for the pilot to determine his speed. The pilot must rely upon, and follow closely, the directions of the plane director.

As the aircraft approaches the catapult, the plane director should position himself forward and remain stationary to give the pilot a visual reference for controlling taxi speed as the aircraft approaches the shuttle.

Upon receiving the signal from the catapult director, release brakes. Immediately increase power to MILITARY in anticipation of the turnup signal from the launching officer.

NOTE

Wind has a negligible effect on EPR readings.

When satisfied that the aircraft is ready for launch, the pilot signifies by placing the master exterior lights switch in the ON position. The pilot must be prepared to establish a wings-level, climbing attitude on instruments. An initial attitude of approximately 12 degrees noseup is recommended. Cross-check angle of attack, airspeed, and other appropriate instruments. Do not rely solely upon one instrument. Ensure a positive rate of climb is obtained. Retract the landing gear at 300 feet or above. Retract flaps at 170 KIAS or above. During night launches, do not make clearing turns. At 2500 feet or higher, adjust exterior lights as briefed.

AIRCRAFT OR CATAPULT MALFUNCTION. The pilot's "NO-GO" signal for night catapult launch consists of not turning his exterior lights ON. The pilot should call on land/launch frequency "Suspend, suspend." Maintain MILITARY power until the launching officer gives the "throttle-back" signal.

Do not turn exterior lights ON unless completely ready to be launched.

Landing Pattern

Night and instrument recoveries normally will be made utilizing TACAN/CCA approaches in accordance with the CVA/ CVS NATOPS Manual.

ARRESTED LANDING AND EXIT FROM THE LANDING AREA

The LSO will normally take control when the aircraft is approximately 1 mile from the ramp. The pilot should have exterior lights set in accordance with Air Wing doctrine. Following arrestment, immediately place master exterior lights switch to OFF. Taxi out of the landing area slowly. Do not stare fixedly at the plane director's wands but use them as the center of the scan pattern.

Carrier-Controlled Approach (CCA)

GENERAL

The pattern procedures, and terms used for carrier-controlled approaches shall be in accordance with the CVA/ CVS NATOPS Manual.

PROCEDURES

A CCA approach is similar to a straight-in jet penetration. Lower the hook entering the holding pattern and maintain maximum endurance airspeed. Single aircraft must leave the Marshal point at estimated approach time (EAT). If the flight consists of two or more aircraft, the Flight Leader normally should plan to be in holding at Marshal in time to make a half standard-rate 180-degree left turn, break off from the flight, and return to the Marshal point at his EAT. Subsequent aircraft in the flight break at 30-second intervals. As each pilot reaches Marshal, he commences his letdown at 250 KIAS, 4000 fpm rate of descent, speedbrakes OUT, and about 80- to 82-percent RPM. At 5000 feet (platform), the rate of descent is reduced to 2000 fpm, although penetration speed is maintained at 250 KIAS. Level off at 1200 feet, retract speedbrakes, and adjust power to maintain 250 KIAS to the 10-mile gate. At this point, transition to 150 KIAS by retarding the throttle to 70 percent. Extend speedbrakes and drop wheels and flaps as airspeed drops below 225 KIAS. Retract speedbrakes and adjust power to maintain 150 KIAS. Aircraft shall be in landing configuration prior to reaching the 6-mile gate. Unless otherwise directed, maintain 1200 feet and optimum approach speed until directed to commence descent at about 2 3/4 miles. Then extend speedbrakes, and maintain optimum AOA/ airspeed.

After transition is made to landing configuration, all turns should be standard rate. Do not exceed 30 degrees bank at any time. Do not exceed 15 degrees bank below 600 feet on final approach.

SECTION CCA

A section CCA may be necessary in the event a failure occurs affecting navigation aids, communications equipment, or certain other aircraft systems. Normally, the aircraft experiencing the difficulty will fly the starboard wing position during the approach. The lead aircraft should fly a slightly faster approach (about 10 knots above optimum AOA/ airspeed) to afford the wingman some comfort and latitude in power control. If leading a dissimilar type aircraft comply with Air Wing doctrine.

Part 4

The section leader will detach the wingman when the meatball is sighted and continue straight ahead, off-setting as necessary to the left to determine if the wingman lands successfully. The leader shall commence a slow descent to not lower than 300 feet altitude and adjust exterior lights in accordance with Air Wing Doctrine to provide the wingman with a visual reference and a leader should the wingman bolter or waveoff. The wingman should not detach unless he has the meatball in sight. Necessary visual signals are contained in figure 7-9.

WAVEOFF/BOLTER PATTERN

Waveoff will be straight up the angled deck, when given close-in. Pilots must bear in mind that during a late waveoff, an in-flight engagement is possible, therefore the aircraft must be lined up with the centerline to reduce the possibility of aircraft damage. After a waveoff or a bolter, establish a positive climb and maintain the approach final bearing. DO NOT CROSS THE BOW while flying upwind. Be alert for other aircraft launching from the catapult or entering the pattern from the break. The aircraft ahead will have priority for the turn downwind. If in doubt, use the radio. A waveoff to the right will be made when overshooting the landing line to the extreme. When waving off to the right, remain well clear of the planeguard helicopter.

Carrier Emergency Signals

See CVA/CVS NATOPS Manual for emergency signals from carrier to aircraft.

SHORT AIRFIELD FOR TACTICAL SUPPORT
(SATS) PROCEDURES (A-4E only)

General

A-4 SATS catapult operations are limited to a minimum gross weight of 18,000 pounds, density altitude ranges from -2000 to +2000 feet, and no more than 15 knots of direct crosswind.

Day Operations

GENERAL

Preflight, start and poststart checks shall be accomplished in accordance with normal field procedures and the additions noted.

PREFLIGHT

1. On the nose gear door, record the expected gross weight of the aircraft for catapult launch.
2. Ensure that the tension bar retainer clip is in good condition and secured.

START

1. Start engine sufficiently ahead of time to allow for taxi, catapult launches, and rendezvous before proceeding on the assigned mission.

POSTSTART

1. Place the emergency-jettison armament switch in the proper position prior to taxi.
2. Set trim and flaps as follows:
 - a. Rudder - 0
 - b. Aileron - 0
 - c. Longitudinal - 5 units ANU
 - d. Flaps - Half.

TAXI

1. Taxiing on advanced airfields presents little difficulty if attention is given to keeping speed under control.
2. Taxiing in and out of revetted areas cannot normally be accomplished without the use of the nose tiller bar.

WARNING

If a tiller bar is being used, apply both brakes simultaneously and with equal pressure. Differential braking can injure the tiller bar operator.

3. Wet or oily metal runway and taxiway surfaces require especially slow taxi speeds due to a greatly reduced coefficient of friction. Sharp turns cannot be made and the wheels will slide with moderate braking action.

SATS CATAPULT LAUNCHES

Proper positioning on the catapult is not easily accomplished because of surface irregularities in the hold-back and arrester area. If the previously launched aircraft utilized afterburner, expect the area aft of the dolly arrester ropes to be wet and slippery. Approach the launch area slowly and be alert for signals from the taxi director.

WARNING

Do not taxi into the dolly arrester ropes immediately following the launch of another aircraft until the dolly returns and is arrested. Failure of the arrester ropes may occur on dolly rebound. Wait until the dolly returns and is arrested.

1. Approximately 80 to 85 percent rpm is required to taxi up and over the arrester ropes and dolly ramp.

CAUTION

Keep speed under control. Do not use differential braking if a nose tiller bar is used.

2. As the main wheels roll over the arrester ropes, be prepared for immediate braking and power reduction.

3. When the "come-ahead" signal is given by the taxi director, move ahead cautiously to prevent over-stressing the tension bar.

4. After the aircraft is properly positioned and the holdback is engaged, the taxi director will signal for the pilot to release the brakes while the catapult is tensioned.

CAUTION

Ensure that the brakes are released before tension is taken.

5. After tension is taken, the taxi director will transfer control of the aircraft to the launch officer who will signal the catapult for prelaunch turnup. When the catapult is ready, the launch officer will signal the pilot for full power. Increase the throttle to MRT, observe acceleration time, and allow the engine to stabilize.

6. Check attitude gyro, RMI, engine instruments, trim indicators, and flap setting. Grip throttle and catapult handgrip firmly.

7. When ready for launch, salute the catapult officer with the right hand, place head against the headrest, observe the green cutoff light, and wait. Launch will occur approximately 3 to 5 seconds after the catapult officer gives the launch signal.

CAUTION

After receiving the signal for full-power turnup, do not allow your hands to appear above the canopy rails unless you intend to salute as a launch signal. Unusual hand movements, such as lowering a helmet visor, will probably result in a premature launch.

TECHNIQUE

1. The low acceleration forces of the SATS catapult make it unnecessary to fully brace the right arm and restrain the stick from movement. Instead, cup the hand just aft of the stick and restrain arm movement by pressing against the side and/or thigh. Upon perceiving the change in the cutoff light from green to amber, grasp the stick and move it to a position slightly aft of trim. Allow the aircraft to rotate to a liftoff attitude (approximately 12 degrees on the attitude gyro) and fly away. The pilot must avoid gross control movements as the aircraft becomes airborne but should be prepared to make any attitude changes required. When safely airborne, retract gear and flaps as appropriate.

2. The A-4 displays an uncontrollable but mild yaw oscillation during SATS catapult launches. The oscillation commences shortly after holdback release and reaches a maximum at bridle shed. The severity of the oscillation increases at the lower gross weights.

CAUTION

Do not attempt to prevent directional oscillation during the power stroke by the use of rudders.

AIRCRAFT OR CATAPULT MALFUNCTION

1. If, after established at MRT, the pilot determines that the aircraft is down, he so indicates to the launching officer by shaking his head from side to side. Never raise a hand into the catapult officer's view to

Part 4

give a "thumbs down" signal. Simultaneously broadcast "Suspend" to the tower. When the catapult officer observes the "No-Go" signal, he will immediately give a suspend signal.

2. If bridle shed or bridle failure occurs after hold-back release, the pilot will note a sudden loss of acceleration; the dolly will continue to accelerate and move ahead of the aircraft. Wait until the dolly can be seen ahead of the aircraft, then maneuver to the side of the runway to avoid contact with the rebounding dolly. If safe abort or takeoff is not possible and ejection speed has been attained - EJECT.

LANDING PATTERN

Approach the breakup point either individually or in echelon, parade formation, at 250 to 300 KIAS. A 17- to 20-second break interval will provide a 35- to 40-second touchdown interval. Have the landing checklist completed, be at optimum AOA/approach speed, and have the wheel brakes checked by the 180-degree position. Speedbrakes will normally remain out throughout the approach and landing. This may not be desirable at gross weights in excess of 14,000 pounds or when configured with high drag stores. Maximum gross weight for an arrested landing is 14,500 pounds and the maximum crosswind component recommended is 15 knots.

APPROACH

Plan for and execute an on-glideslope, optimum AOA, on-speed approach. Pay particular attention to maintaining the proper airspeed and correct lineup.

WAVEOFF

To execute a waveoff, immediately add full power, retract speedbrakes, and maintain optimum attitude. Make all waveoffs straight ahead until clear of the landing area.

CAUTION

Rotation of the aircraft to an exaggerated nose high attitude on waveoff lowers the arresting hook beyond its normal reach and can result in an inflight engagement.

ARRESTED LANDING

The aircraft should be on runway centerline at touchdown. Aircraft alignment should be straight down the runway with no drift. Upon touchdown, maintain the throttle at the approach position and retract the speedbrakes. When arrestment is ensured, retard the throttle to idle. Allow the aircraft to roll back to permit the hook to disengage from the pendant. When directed by the taxi director, apply both brakes to stop the rollback, and raise the hook and flaps. If further rollback is directed, release brakes and allow the aircraft to be pulled back until a brake signal is given. Then apply brakes judiciously to prevent the aircraft from tipping or rocking back.

CAUTION

Be very careful when taxiing on a wet SATS runway.

BOLTER

Bolters are easily accomplished. Simultaneously close the speedbrakes, apply full power, and retract the arresting gear hook. Smoothly rotate the aircraft to a liftoff attitude and fly away.

WARNING

If landing on a runway with a SATS catapult installed, be careful to prevent engagement of the dolly arrester ropes with the aircraft's tailhook, or structural damage to the aircraft and catapult will result.

Night Operations

GENERAL

This section covers only that portion of night operations significantly different from day operations.

POSTSTART AND TAXI

It is prudent to perform the poststart and taxi phase with the aircraft exterior lights and rotating beacon operating if allowed by local regulations and combat conditions. Wing lights should be on BRT/STDY.

CATAPULT LAUNCHES

Immediately prior to taxi onto the catapult, turn off all exterior lights using the master exterior light switch and the rotating beacon switch. Rely upon and

follow closely the directions of the plane director. Upon receiving the signal from the plane director, release brakes as tension is applied. When given the turnup signal by the catapult officer, apply full power, and check acceleration time and instruments. When satisfied that the aircraft is ready for launch, so signify by placing the master exterior light switch in the ON position. Be prepared to establish a wings-level climbing attitude on instruments. An initial attitude of approximately 12 degrees noseup is recommended. Retract gear when above 300 feet, and retract flaps at no lower than 170 KIAS. When climbing through 2500 feet, adjust lights and radio as briefed.