

The A-4 Legend for FS2004



By Marcel Hendrikse
www.simwings.nl

Introduction

During the height of the air war over North Vietnam, in 1967, one US Navy attack aircraft gained great fame. It flew more missions and suffered more losses than any attack plane in the Vietnam conflict. This was the Douglas-built A-4 Skyhawk, affectionately known as 'The Scooter'.

Famous naval aviators like James Stockdale and John McCain were flying the A-4 at the time they were shot down over and imprisoned in Hanoi. Other famous US aviators associated with the A-4 are Bryan Compton (who commanded Attack Squadron 163 "The Saints" when they successfully hit the Hanoi thermal power plant and isolated Haiphong by blowing all bridges leading to the port city), Frank Elkins, whose diary was published by his wife after he was shot down over North Vietnam and Homer Smith, who extensively combat-tested the Walleye missile and ultimately died in captivity.

A-4 pilots are among the most decorated pilots emerging from the Vietnam conflict.

In the dawn of its operational career, in the mid-1990's, the A-4 was still active. Its trainer version, the TA-4J, was at that time in use in the US Navy Training Command. The TA-4 was later replaced by the T-45 Goshawk.

This document serves to give you some information and exercise to be used flying either the (payware) *RAZBAM* A-4 variants or any freeware version obtainable from Flightsim.com.

This document assumes prior flightsim experience!

Have fun flying the legendary Scooter!

Marcel Hendrikse, December 2016

Resources

Aircraft

As stated, you can opt for either a payware aircraft or a freeware download. The RAZBAM A-4 is by far the most detailed on the block. This product line has many variants, ranging from the original A-4A (prototype) to the A-4H/K export versions, combined with a multitude of liveries (repaints).

Freeware versions are obtainable from Flightsim.com. The most recent full packages you can get from this site date from September 2012. These are the links:

- <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=168454>
- <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=168452>
- <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=168457>

Scenery

- NAS Pensacola + carrier: <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=172454>
- NAS Fallon (for strike training):
<http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=172458>
- Arrestor cables: <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=117609>
- Aircraft carriers: <http://www.flightsim.com/vbfs/fslib.php?do=copyright&fid=96872>

Additionally

I strongly recommend FSNavigator as a nice navigational help with many functionalities.

Getting started

Your first task will be to check out the downloaded flightsim aircraft. Designers give them certain characteristics and that's what you'll have to work with. Unless, of course, you have some aircraft designing experience yourself. In that case, you may be familiar with AirEd.exe with which you can edit large numbers of values that apply to the .air file of the aircraft at hand.

But assuming you're **not** a designer, you really have no alternative but to fly the thing 'as it comes'.

Flight 1 - phase 1

1. Choose a station. Install scenery or use existing scenery in your FS2004 installation. Go to Pensacola, Meridian or Kingsville and position your Skyhawk on the active runway. For the ease of this exercise, set clear weather
2. Acquaint yourself with the panel. Take a look at the instruments and any additional panel screens (usually accessible via SHIFT and a number). Make sure you have the location of the primary flight instruments well engraved in your mind, so it will be easier to develop an effective instrument scan.
3. Set 1 notch of flaps and gradually increase the throttle to full. The aircraft accelerates; pull back on the stick at around 120 knots.
4. Maintain your attitude (have the horizon just visible above the top edge of the instrument panel), retract gear and flaps. Watch the airspeed indicator to verify aircraft acceleration.
5. Practice using attitude to control speed. Raise or lower the nose and watch the reaction of the aircraft's airspeed. Choose an airspeed and use the nose attitude to maintain that airspeed.
6. Level off at 20,000 feet. Watch your rate of climb, which is displayed in thousands of feet per minute. At 10% of your rate of climb below 20,000 feet, start pushing (and trimming!) the nose down and aim to end up at 20,000 feet without overshooting it. The 10%-rule means if you're climbing at 3,000 feet per minute, you'll have to start levelling off at $20,000 - 300 = 19,700$ feet.
7. Once levelled off, adjust your speed to 230 knots

Flight 1 - phase 2

1. Make a couple of **level** turns at different angles of bank (shallow: 10-20 degrees, standard: 30 degrees, sharp: 45-90 degrees). This will let you get used to the aircraft's 'feel'. It may tend to roll back to wings level when you stop the sideways movement of the control stick, or it may remain banked. Check it out and keep it in mind.
2. Let's do a simple S-turn. Make sure you have a stopwatch ready. When you start the stopwatch, pull up into a 1000 feet per minute-climb, maintaining that for a minute, then level off. **Check that time and arrival at altitude [at 21,000 feet] coincide as much as possible and keep your speed as constant as possible.** *ANTICIPATE: 100 feet prior to target altitude!*
3. Right after levelling off, start a 1000 fpm **descent** back down to 20,000 feet, again anticipating the pull-up by 100 feet and maintaining a constant speed of 230 knots.

Flight 1 - phase 3

The next manoeuvre in this flight will be the so-called “Yankee pattern”. A graphical depiction of this flight profile is in the appendix of this document.

In order to be able to carry out the Yankee pattern, you must be familiar with the word **SRT**, or **Standard Rate of Turn**.

Standard Rate of Turn is defined as a 3° per second turn, which completes a 360° turn in 2 minutes and a 180° turn in 1 minute. The 1-minute turn can also be referred to as ‘**half standard rate**’.

Start the Yankee pattern at 20,000 feet, flying 230 knots, on a cardinal heading (due N/E/S/W)

- Deploy the speed brake, adjust throttle to maintain 230 knots and start a 4,000 feet per minute descent
- Start a left-hand, half standard rate, still descending
- **In the turn**, level off at 10,000 feet, retract the speed brake and set power for 225 knots
- Maintain straight and level flight at 225 knots for 1 minute
- Turn 45 degrees to the left at a half standard rate turn
- Lower gear and flaps, let airspeed stabilize at 150 knots
- Once stabilized, deploy speedbrakes and adjust power to maintain 150 knots
- Turn right 180 degrees, standard rate turn
- On completing this turn, start timing 30 seconds and decrease speed to approach speed (around 110 knots in the A-4)
- After 30 seconds, start a 500 feet per minute descend at approach speed and optimum AOA (Angle Of Attack)
- Hold this descending path for 2 minutes (so you should descend from 10,000 to 9,000 feet; don’t go lower than that!)
- After 2 minutes, level off at 9,000 feet, pull in the speedbrakes, raise gear and flaps and add power to go back to 230 knots
- Terminate flight (ESC, then E)

Flight 2

The next flight will be a short exercise in handling the A-4 whilst gliding. It simulates an engine failure, whereupon you must assume the correct gliding attitude.

- Choose a station. Install scenery or use existing scenery in your FS2004 installation. Go to Pensacola, Meridian or Kingsville and position your Skyhawk on the active runway. For the ease of this exercise, set clear weather
- Take off and climb to 30,000 feet. Make it a turning climb so you won’t stray too far from the base
- At 30,000 feet, fly straight and level for a minute, speed 220-230 knots
- Shutdown the engine (CTRL+SHIFT+F1); watch the RPM unwind, stay at 30,000 feet as long as possible
- Below 35,000 feet, the A-4’s gliding speed is 200 knots. Use your nose attitude to keep that speed (pull up to ‘brake aerodynamically’, push nose down to gain speed). Remember that pushing the nose down will decrease the number of miles you can travel with the engine off!
- Watch your altitude; relight engine (CTRL+E) at 18,000 feet
- Recover to straight and level flight and end the flight (ESC, then E)

Flight 3

This flight will go through the procedure of arriving over and landing at the naval airstation. The phases have been taken from the A-4 manual and can be divided as follows:

- Entry
- Break
- Downwind
- Base
- Final

See the diagram in the appendix for a graphical overview

- **ENTRY**
 - Line up with the runway from about a 5-10 mile distance. Fly over the runway at 800 feet AGL at 250-300 knots. The manual says “as desired” for speed and speed brakes: just keep the mentioned speed, leave the speed brake and proceed to the next phase
- **BREAK**
 - Deploy speed brake, roll into a 45-degree left-hand turn, deploy gear below 230 knots and descend to no lower than 600 feet AGL. Pulling back on the stick is necessary for this! The G’s you pull, will also have a braking effect.
- **DOWNWIND**
 - Lower the flaps, retract the speed brake. Speed: 150 knots, may be decreasing to 120 knots
- **BASE**
 - About 15 seconds after passing the runway treshold at your 9 o’clock, start your turn to base, speed constant at 120 knots. Use the virtual cockpit to help in properly lining up with the runway. Descend to 300 feet
- **FINAL**
 - Airspeed down to 110 knots, going for the numbers on the runway

Landing the navy way involves flying onto the tarmac at a constant speed.

There is no idling the throttle or raising the nose (‘flaring’) like the Air Force boys do.

You can now use this ‘race track’ pattern to execute a couple of touch and go’s or waveoffs. Of course, the difference between the two is that the touch and go has the aircraft actually contacting the runway, whereas the waveoff involves adding power BEFORE the wheels touch the ground.

After adding power, climb, gear up, at 500 feet flaps up, then turn to the left, to downwind and repeat all steps from “DOWNWIND” in the above list. Keep an eye on your fuel!

Flight 4

Launching and recovering from the carrier is basically described in the vNAVCAD curriculum, pages 57 and up, at <http://vnavcad.simwings.nl/T-2.pdf>, so for flight 4, I will simply refer to that piece of information. It is preceded by field carrier landing practice (FCLP), which is basically equal to what flight 3 involves, repeated many times over.

Flying off and landing on a carrier requires you have absolute control and familiarity with your aircraft, so make sure you have had plenty of practice with your selected Skyhawk and know it from A to Z!

Refer to the diagram in the appendix labeled “Day Carrier Pattern”.

Flight 5

The recovery of aircraft at night or in low/less visibility can be done with the procedure labeled “Carrier Control Approach”. It involves flying to a holding point (Marshal) and from there initiate a staged descent toward the aircraft carrier (it is not used for shore operations).

Marshal points are holding fixes. The lowest altitude that can be assigned is 5,000 feet at 20 miles from the ship. Each subsequent marshal is 1 mile further and 1,000 feet higher:

Altitude	Distance
5000	20
6000	21
7000	22
8000	23
9000	24
10000	25

The 5000 feet-20 mile point is also known as “Platform”.

Flying toward the carrier from a marshal point requires the following steps (A-4 specific procedure taken from the manual. Text and values in other sources may differ!):

- From the marshal, descend to 5,000 feet at 4,000 fpm, 250 knots, speedbrakes out
- On “Platform”, reduce the rate of descent to 2,000 fpm and maintain 250 knots, descend to 1,000 feet
- Level off at 1,000 feet, retract speed brakes, adjust power to stay at 250 knots
- You’re now flying toward the 10-mile ‘gate’.
- At 10 miles from the ship, deploy speed brakes, and lower gear and flaps below 225 knots. Adjust power to maintain 150 knots
- At 6 miles, descend to 600 feet and transition to approach speed (110-120 knots). **Extend your hook.**
- Maintain 600 feet until you intercept the glidescope of the ILS system aboard ship and follow it down to the deck

Remember to fly the plane to the deck!

Do not flare, do not idle the throttle until the system indicates you've caught a wire!

On touchdown, retract the speed brakes and go to full throttle until the rapid deceleration occurs, then go to idle power.



Flight 6

Download the Fallon NAS scenery and start from that base. Pick a target (city, bridge, airfield) some distance from Fallon and plan to fly there at 22,000-24,000 feet.

Over the target, roll in and carry out a dive-bombing attack on the target, with a dive angle of about 45 degrees.

This will require some practice.

You will be diving and that means you're converting your altitude into airspeed. **KEEP A CLOSE EYE ON YOUR AIRSPEED!** You don't want to get it out of hand.

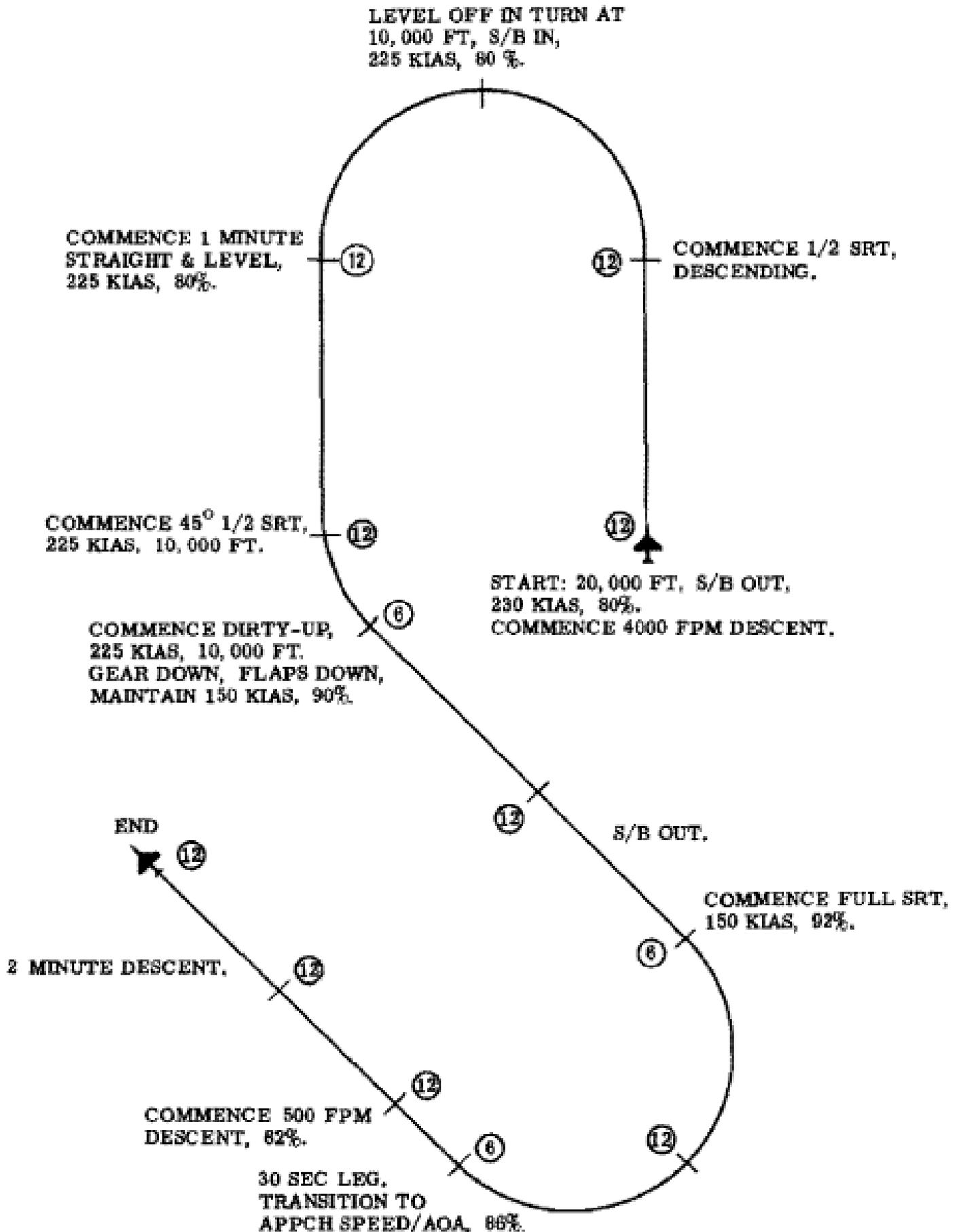
Pull up from your dive at 9,000 feet AGL (so make sure you know how high the terrain in the target area is!) and climb back to 20,000 – 23,000 feet. While pulling up, make sure you don't overcontrol that action. Depending on the aircraft model data in the simulator, you could end up with a heavily pitching aircraft. Determine the best G-load to safely execute the pull-out.

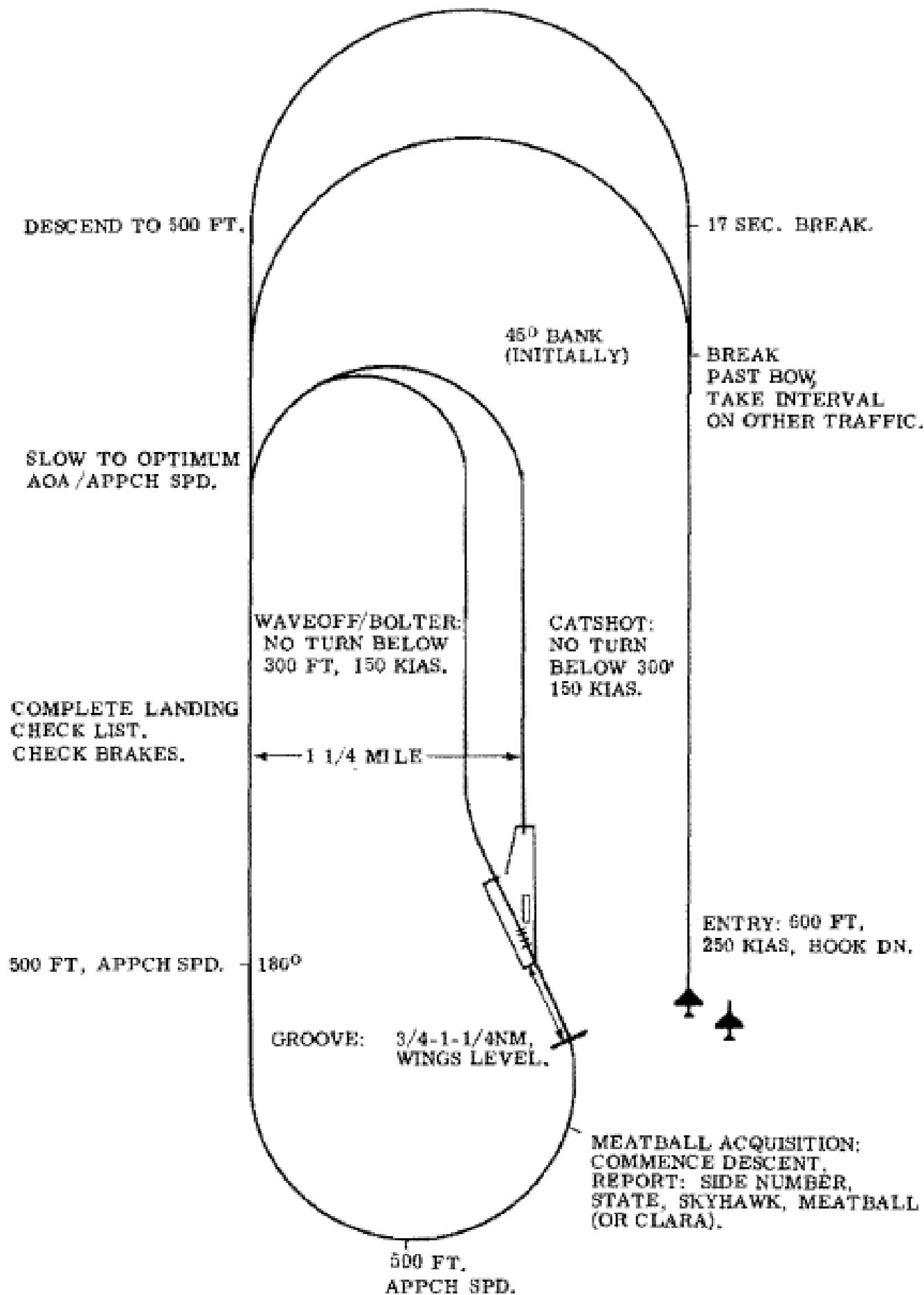
Either repeat the diving attack or return to Fallon.

This was the last flight. I hope you enjoyed flying these hops. Any questions re this document can be directed to mba@freeler.nl

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APPENDIX: Some extra diagrams & numbers

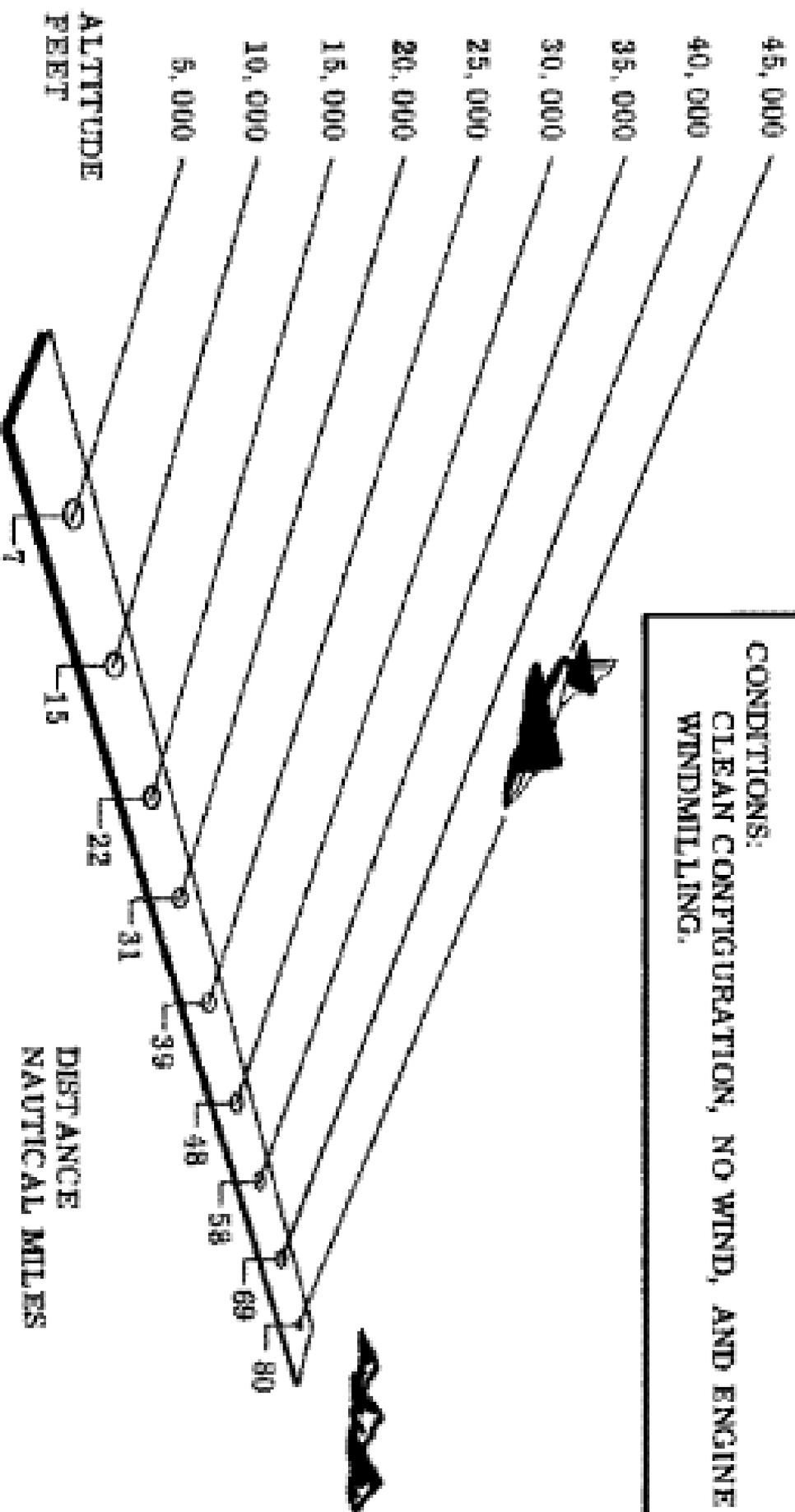




Day Carrier Pattern.

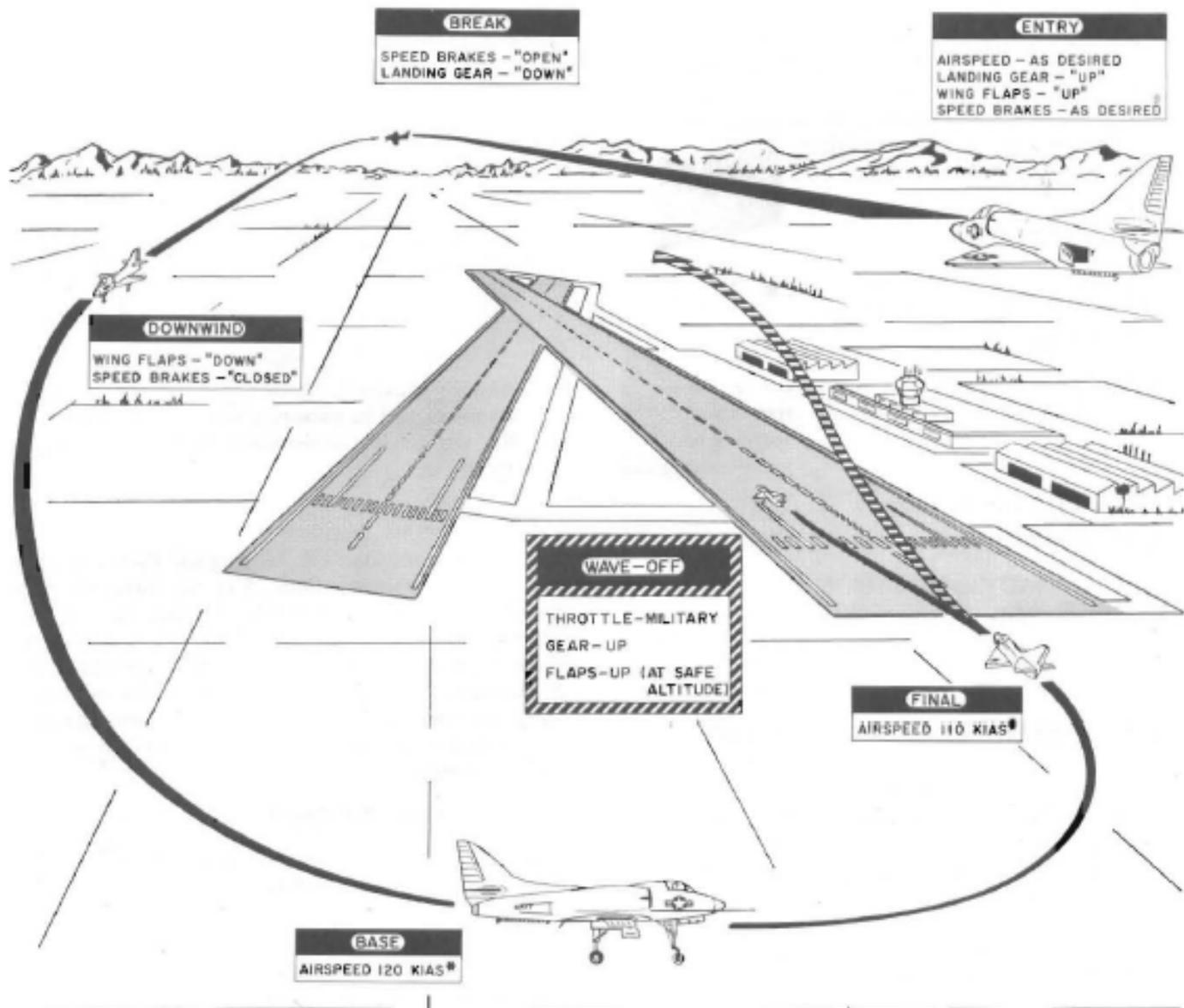
RECOMMENDED GLIDING SPEED
 250 KNOTS IAS AT 45,000 FEET.
 220 KNOTS IAS AT 40,000 FEET.
 200 KNOTS IAS AT 35,000 FEET AND BELOW.

CONDITIONS:
 CLEAN CONFIGURATION, NO WIND, AND ENGINE
 WINDMILLING.



CARRIER CONTROLLED APPROACH (CCA)

(2) Procedures. A CCA approach is similar to a straight-in jet penetration. Maintain maximum endurance airspeed while holding. Lower the hook upon entering the holding pattern. Single aircraft must plan to leave the Marshal point at EAC. If the flight consists of two or more aircraft, the Flight Leader normally should plan to be 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 EAC. Subsequent aircraft in the flight break at 30-second intervals. As each pilot reaches the Marshal point, he commences his letdown at 250 KIAS, 4,000 ft./min. rate of descent, speedbrakes OUT, and about 80-82 percent. At 5,000 feet ("platform"), the rate of descent is reduced to 2,000 ft./min., although penetration speed is maintained at 250 KIAS. Level off at 1,000 feet, retract speedbrakes, and adjust power to maintain 250 KIAS to the 10-mile gate. At this point, transition to 150 KIAS by retarding throttle to 70 percent. Extend speedbrakes and drop wheels and flaps as airspeed drops below 225 KIAS. Adjust power to maintain 150 KIAS. All aircraft shall be in the landing configuration prior to reaching the 6-mile gate. Unless otherwise directed, a gradual descent to 600 feet will be made departing the 6-mile gate. Upon reaching 600 feet, transition to final approach speed (optimum angle of attack/airspeed). This altitude and airspeed will be maintained until in visual contact with the "meatball" at about 1-1/4 miles, or until informed by the final controller or LSO to commence letdown at 500 ft./min., or as directed. Fly into the "meatball" until it is centered and commence the descent, maintaining optimum AOA/airspeed. The use of the speedbrakes may not be desirable when the approach is made at aircraft gross weights (in excess of 13,000 pounds) and configured with drag stores, i. e., buddy stores, MCBR's, etc., due to the high thrust required during the approach. After transition is made to landing configuration, all turns should be standard rate. Do not exceed 30 degrees of bank at any time. Do not exceed 15 degrees of bank after leaving 600 feet on final approach.



NOTE
*AIRSPEEDS GIVEN ARE BASED ON A NORMAL LANDING GROSS WEIGHT OF 11,556 POUNDS. FOR EACH 1000 POUNDS INCREASE IN GROSS WEIGHT, APPROACH SPEEDS SHOULD BE INCREASED FIVE KNOTS.