# DELTA VIRTUAL AIRLINES


## Boeing 727-200
## Aircraft Operations Manual

**Fifth Edition**
**February 2012**

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# Welcome

Welcome to the Delta Virtual Airlines Aircraft Operating Manual (AOM) for the Boeing 727-200.

This AOM is based upon the DVA Fleet Installer airplane. We are always seeking to improve the accuracy of this AOM. Should you have questions about the specifics of this airplane, this manual or aviation in general, you should create a help desk issue at our website, www.deltava.org that states your question and we will do our best to answer your questions.

Should you have questions about aviation in general, creating a help desk issue is the best course of action to take. The training department and the flight academy personnel, who will do their best to answer your questions, will address these.

If you are new to flying and would like to learn training that is modeled after real world training, you can sign up for flight instruction in the DVA Flight Academy.

# History and Overview

The versatility and reliability of the Boeing 727 - first tri-jet introduced into commercial service - made it the best-selling airliner in the world during the first 30 years of jet transport service. The jet age essentially began in 1952 with the introduction of the British-designed DeHavilland Comet. Several jetliners, including the Boeing 707, were developed before the 727, but none came close to its sales record.

Production of the 727 extended from the early 1960s to August 1984 - a remarkable length of time, considering the original market forecast was for 250 airplanes. As it turned out, 1,831 were delivered. Twenty years later, when the last 727 was delivered, this versatile fleet was carrying 13 million passengers each month. As of December 1998, nearly 1,500 of the reliable aircraft were still in service. On January 13, 1991, the first 727 built (which had been in continual service with United Airlines since 1964) finally made its last commercial flight and was donated to the Museum of Flight in Seattle.

Introduced into service in February 1964, the 727 became an immediate hit with flight crews and passengers alike. With a fuselage width the same as the 707 (and the later 737 and 757), it provided jet luxury on shorter routes. With sophisticated, triple-slotted trailing edge flaps and new leading-edge slats, the 727 had unprecedented low-speed landing and takeoff performance for a commercial jet and could be accommodated by smaller airports than the 707 required.

The 727, like all Boeing jetliners, was continually modified to fit the changing market. It began with the -100 series, of which 407 were sold. This was followed by the -100C convertible that featured a main-deck side cargo door, allowing it to carry either cargo pallets or passengers - or a combination of both - on the main deck. Boeing built 164 of these. The 727-200, introduced in December 1967, had increased gross weight and a 20-foot longer fuselage that could accommodate as many as 189 passengers in an all-tourist configuration. In all its variations, 1,245 of the -200s were sold. The last version, the 727-200F, had a 58,000-pound, 11-pallet cargo capability. Fifteen of these were sold to Federal Express.

Structural improvements, a more powerful engine and greater fuel capacity led to the Advanced 727-200 in May 1971. This advanced series had improved payload/range capability, better runway performance and a completely restyled "widebody look" as standard equipment. Lufthansa German Airlines and Air Algerie put 727s with the new interior into service in April 1971. Passenger response was enthusiastic, and by November 1972, this spacious interior was standard equipment on all production 707, 727 and 737 aircraft, and was offered for retrofit as well.

Later performance improvements for the 727 included another gross weight boost, from a maximum 170,000 pounds (77,122 kg) to 191,000 pounds (86,600 kg) for the Advanced version. On February 3, 1972, another increase to 208,000 pounds (94,348 kg) was announced, together with the purchase of three of the "heavyweights" by Sterling Airways of Denmark. The 727's highest gross weight was eventually raised to 210,000 pounds (95,300 kg).

The 727 became the best-selling airliner in history when orders passed the 1,000 mark in September 1972. By January 1983, orders reached 1,831. One Boeing-owned test airplane brought the grand total to 1,832. Today, only the Boeing 737 has surpassed that total. On

December 5, 1977, the worldwide 727 fleet carried its one-billionth (1,000,000,000) passenger -- a mark never attained before by a commercial aircraft. By September 1995, the number had reached 4.2 billion.

One hundred and one customers purchased new 727s from Boeing, although dozens more have placed the airplane type into service as "second tier" operators. More than 200 727's built as passenger airplanes have been converted to freighters, a process that continues today.

In April 2003, Delta Air Lines retired their final Boeing 727, completing a process accelerated by war, terrorism and the slumping economy. Although this remarkable aircraft has been retired from Delta's mainline fleet, it continues to ply the virtual skies at Delta Virtual Airlines.

# Aircraft Milestones

| | |
|---|---|
| **December 5, 1960** | A new three-engine jet, the 727, is announced. United Airlines and Eastern Airlines each order 40. |
| **February 9, 1963** | 727 first flight from Renton Field. |
| **October 29, 1963** | First 727 delivered to United under provisional FAA Certificate. |
| **November 3rd, 1963** | The 727 completes 76,000-mile (121,000-km) world tour to 26 countries. |
| **February 1964** | Eastern and United start regular 727 commercial service. |
| **August 5, 1965** | Long-bodied 727-200 announced, for deliveries in 1967. |
| **April 13, 1966** | First "Quick Change" passenger-cargo model delivered to Northwest Airlines. |
| **July 27, 1967** | First flight of the 727-200. |
| **December 11, 1967** | First 727-200 delivered; Northeast Airlines put it into service three days later. |
| **December 26, 1967** | 500th 727 delivered. |
| **April 1971** | Lufthansa, Air Algerie introduce 727s with new interiors. |
| **June 1972** | Delivery of first Advanced 727-200, to All Nippon. |
| **September 1972** | Total orders reach 1,000. |
| **November 1973** | Delivery of first 208,000-pound, high-gross-weight version to Sterling (later upped to 210,000 pounds) |
| **January 1974** | 1,000th 727 delivered (Delta Air Lines). |
| **April 1977** | 727 becomes first "standard fuselage" U.S. transport certificated for Cat. IIIA landing (when properly equipped). |
| **January 1978** | Total 727 orders hit 1,500. |
| **July 1979** | 1,599th Boeing 727 delivered, to United Airlines. |
| **September 29, 1981** | Boeing offers first 727-200 Freighter; Federal Express orders 15. |
| **May 26, 1982** | 1,800th delivered, to Pan Am. |
| **April 6, 1983** | Last passenger 727 delivered to USAir. |
| **September 18, 1984** | Last 727 delivered (a 727-200F to Federal Express) after 22 years of production; 1,832 total built. |
| **January 13, 1991** | First 727 built retired from United Airlines service; donated to Museum of Flight in Seattle. |
| **April 6, 2003** | Delta Air Lines flies last revenue 727 flight, from Greensboro, NC to Atlanta. |

# 727 Program Breakthroughs

- First certificated commercial trijet (December 1963).
- First "Quick Change" aircraft operated with passenger configuration during day and converted to all-cargo at night.
- First to bring the speed and comfort of jet travel to hundreds of communities with short runways -- as short as 5,000 feet.
- First commercial airplane in history to surpass the 1,000-sales mark for civil use.
- First airplane to have a triple-slotted flap system for superior takeoff and landing performance.
- First Boeing jetliner with completely powered flight controls. All flight controls are hydraulically powered, with dual units, except for the horizontal stabilizer, which is trimmed electrically.
- First trijet to fly the North Atlantic with passengers, carrying charter loads between Canadian and European cities.
- First commercial airplane to win a medal of honor from a king for surviving a fighter strafing attack (Morocco 1972).
- Pratt & Whitney designed the JT8D turbofan engine specifically for the 727, the first time in commercial aviation that a jet engine was "tailor-made" for an airplane.
- First airplane to use the "jet mixing" principle for quieter operation. Because the engine had the lowest jet exit velocity of any engine when it was introduced, it also had the lowest noise level from the tailpipe.
- First airplane to be certificated to FAA noise rules (FAR 36), even though Boeing was not required to do so because the airplane was in service years before the rule was written.
- First large commercial airplane to carry its own built-in air stairs and auxiliary power unit and to feature single-point refueling for total independence of ground support equipment at through stops.
- First airplane to be subjected to The Boeing Company's brutal fatigue testing and static airframe testing prior to flight. The $30 million test program was designed to ensure that no redesign of production airplanes would be necessary. During fatigue testing, the airframe demonstrated a useful life of more than 20 years of normal service.
- First jet airliner certified by the FAA for operation from gravel runways.
- First jet airplane considered quiet enough to use LaGuardia Airport in New York City. Two U.S. trunk operators began service June 1, 1964, from LaGuardia, both using 727s.
- First jetliner to prove it could operate -- even with one engine out -- from Bogotá, Colombia (8,355-foot elevation), Cuzco, Peru (10,800-foot elevation), and La Paz, Bolivia (13,358-foot elevation). No jet had operated at any of these airports before.
- First in range of all the "smaller" airliners. In 1973, an Advanced 727-200 flew nonstop from Toronto, Canada, to Copenhagen, Denmark -- a distance of 3,975 statute miles.

# Specifications

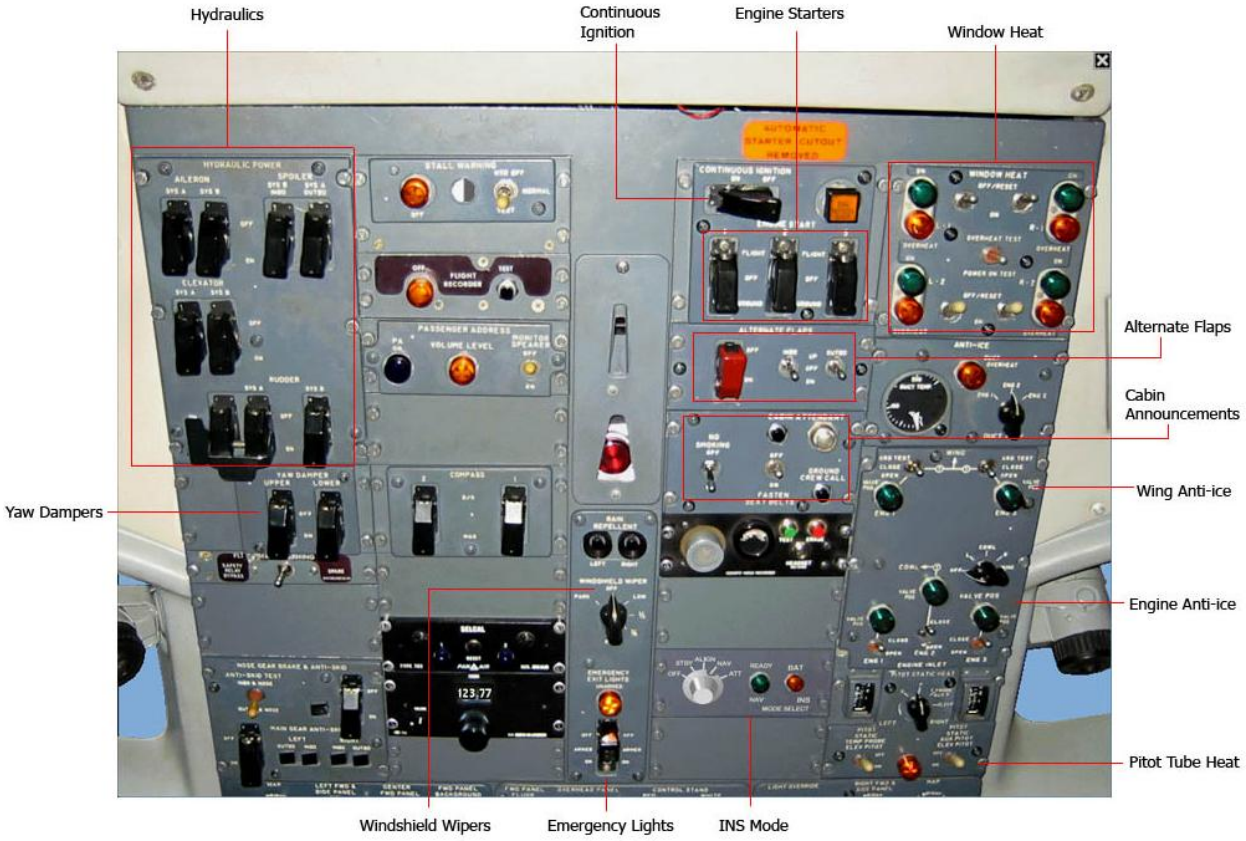
| DIMENSIONS | 727-100 | | 727-200Adv |
|---|---|---|---|
| Length | 133 ft | | 153 ft |
| Height | 34 ft | | 34 ft |
| Wingspan | 108 ft | | 108 ft |
| Wing Area | 1700 $ft^2$ | | 1700 $ft^2$ |
| **POWERPLANTS** | | | |
| Engine Type | Pratt & Whitney JT8D-15 | Pratt & Whitney JT8D-17 | Pratt & Whitney JT8D-17R |
| Maximum Thrust | 15,500 lbs (each) | 16,000 lbs (each) | 17,400 lbs (each) |
| **WEIGHTS** | | | |
| Operating Empty Weight | 87,600 lbs | | 97,600 lbs |
| Max Takeoff Weight | 160,000 lbs | | 184,800 lbs |
| Max Landing Weight | 137,500 lbs | | 154,500 lbs |
| **CAPACITY** | | | |
| # of passengers in typical configuration | 125 | | 155 |
| Max Seating Capacity | 131 | | 189 |
| Cockpit Crew | 3 | | 3 |
| **PERFORMANCE** | | | |
| Service Ceiling | 36,000 ft | | 42,000 ft |
| Maximum Range in NM | 2,700 nm | | 2,500 nm |
| Typical Cruise Speed | 0.81 Mach | | 0.81 Mach |
| Maximum Fuel Capacity | 51,460 lbs | | 54,200 lbs |
| Takeoff runway length | 5,000 - 6,000 ft | | 5,000 - 6,000 ft |
| Landing runway length | 4,800 ft | | 5,080 ft |

# Cockpit checkout

## MAIN PANEL

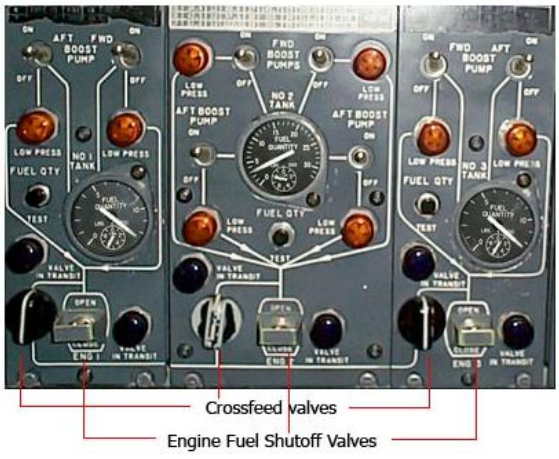

## INERTIAL NAVIGATION SYSTEM AND TCAS

# OVERHEAD



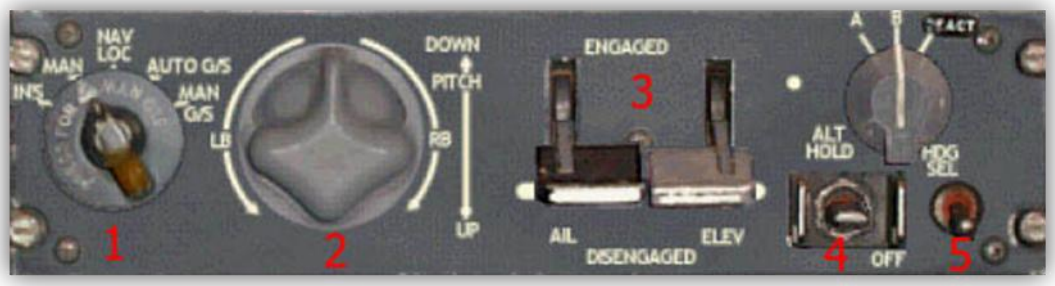

## Radio Stack


## Fuel Panel



# The Sperry SP-50 Autopilot

In most modern airplanes, operating the autopilot is a rather easy, simple task, consisting of dialing an altitude, heading or speed in the MCP, so that the aircraft's computer complies as needed. This is not the case of the older systems. This section is especially dedicated to the use of the Sperry SP-50 autopilot, one of the first of its kind, used in several classic aircrafts like the 727. Its operation is simple, and it shouldn't take an experienced pilot a lot of time to master it.




The Autopilot control unit is located in the radio stack, lower right side of the captain. There are 2 knobs, 2 levers and 2 switches that operate the SP-50.

1. Autopilot mode knob
    - **INS**: the aircraft follows the HDG from the Inertial Navigation System.
    - **MAN**: to control pitch and heading manually, using the pitch and turn controller.
    - **NAV/LOC**: the aircraft captures and follows a VOR radial from the NAV1 frequency.
    - **AUTO G/S**: the aircraft will capture and follow the localizer and the glide slope.
    - **MAN G/S**: the aircraft will capture and follow the localizer and the glide slope.
        - NOTE: The 727 isn't equipped with an Autoland function. Should you choose to engage Auto/Man G/S, you will have to disconnect the autopilot and land by hand if you don't want the aircraft to crash.
2. Pitch and turn controller
    - **Pitch**: as depicted by the white arrow on the right side of the knob, pulling the knob down will increase the pitch, thus increasing the climb rate, and pulling it up will decrease the pitch, causing the aircraft to descend. NOTICE: ELEV lever must be engaged in order to use this.
    - **Turn**: turning the knob to either side causes the aircraft to bank right or left.

3. Autopilot Engage/Disengage levers
    - **AIL**: lever up engages the lateral navigation autopilot. This activates the functions provided by knob 1 (autopilot mode), the turn controller from knob 2, and can be engaged apart from the ELEV lever. NOTICE: if engaged individually, the pilot must still control the climb/descend rate or hold an altitude MANUALLY.
    - **ELEV**: lever up engages the vertical navigation autopilot. When engaged, the aircraft will hold the current climb/descent rate.

4. **ALT HOLD**: it holds the aircraft at the altitude at which the switch was engaged.
5. **HDG SEL**: it holds the heading indicated by the yellow bug in the HSI.

# Flying the aircraft – Tutorial

Welcome to your tutorial flight onboard of the Delta Virtual Airlines Fleet B727-200 aircraft! The purpose is to get you familiarized with the procedures and operation of this airplane, using VOR navigation, charts, and mainly your head!

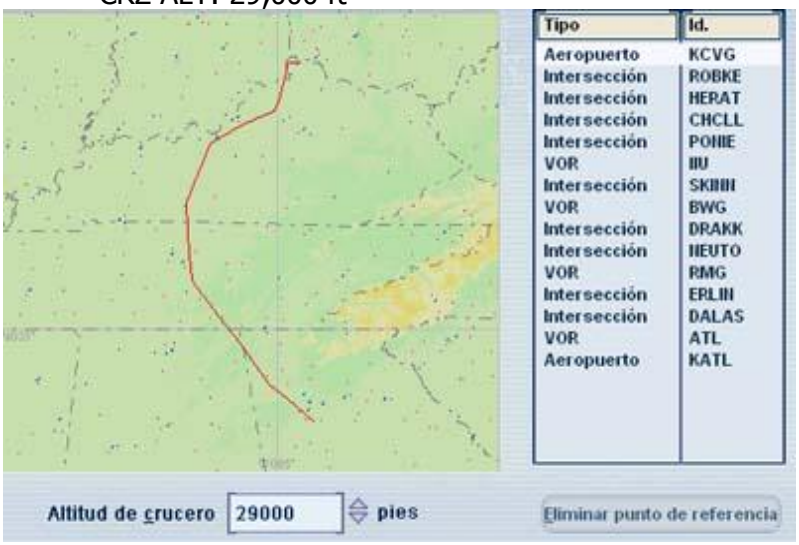
Since the B727 is a Stage 3 Program at Delta Virtual Airlines, you are expected to have sufficient knowledge to go through procedures like SID's and STAR's, use of runways, etc; therefore, they will not be explained in this tutorial. You will learn how to properly handle the SP-50 autopilot, hand-fly when necessary, and follow every step without the use of any kind of on-board computer.

Let's get down to business! Today you'll take the B727-200 from Cincinnati (KCVG) to Atlanta (KATL) on what used to be a real-world flight for this airplane. So load up Flight Simulator and select the Fleet 727-200 from the aircraft menu.

## FLIGHT PLAN

**Equipment**: Boeing 727-200
**Payload**: 23,000 lbs
**Fuel**: 20,750 lbs
**Weather**: Skies clear
**Route**: BLGRS8.BWG.RMG3

- SID: Bluegrass 8 Departure, Bowling Green transition. RWY 27.
- STAR: Rome 3 Arrival, Bowling Breen transition. RWY 26R.
- CRZ ALT: 29,000 ft




Don't worry, you will not have to make a Flight Simulator flight plan like the one above, it is only there to show you the whole route visually. Actually, the entire flight can be done with nothing but your NAV1 and NAV2 frequencies, your charts and some effort. Right now would be a great time for you to go and get the SID and STAR charts from the Delta Virtual Airlines website. Let's go over them before moving on to start flying the airplane.

# FUEL PLANNING

The Delta Virtual Airlines B727-200 equipment has three fuel tanks: Left (12,000 lbs), Right (12,000 lbs) and Center (30,000 lbs), for a total of 54,000 lbs of fuel, making this aircraft capable of flying over 2,000 NM on fuel tanks. However, you must remember NOT to exceed the MTOW: try reducing the number of passengers and payload weight. The standard payload weight is 20,000 lbs.

For this tutorial flight, we will use the following calculations to obtain the necessary fuel load. Notice that for future reference, only the distance will vary, and it's marked in red.

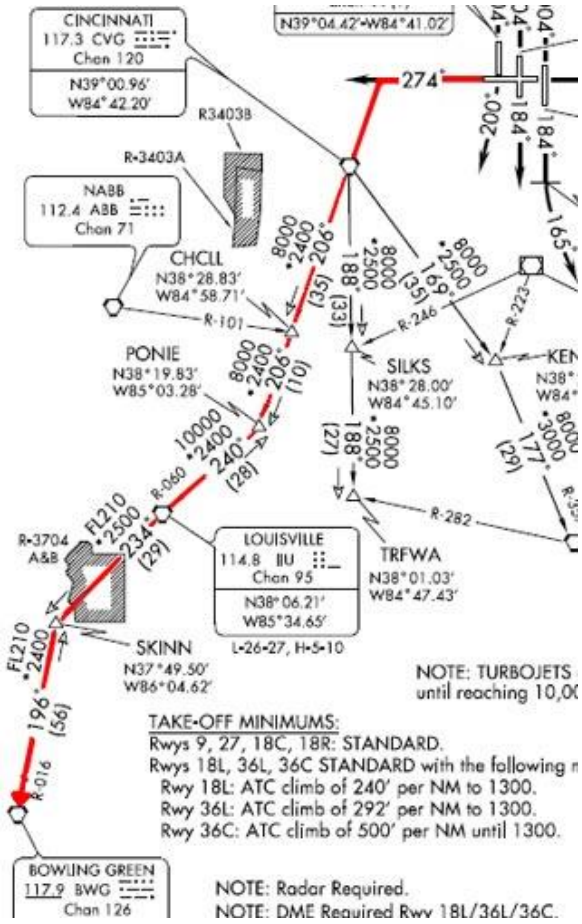
- Base fuel: **5,000** lbs
- Taxi fuel: **2,500** lbs
- Trip fuel: **6,500** lbs
    - *Fuel Burn Rate Factor* = Standard Burn Rate/Speed = 9000 (lb/hr) / 450 (NM/hr) = *20 lb/NM*
    - Trip Fuel = Distance * Fuel Burn Rate Factor = 325 NM * 20 (lb/NM) = 6500 lbs
- Alternate Fuel: **6,750** lbs
    - 45-minute reserve = 0.75 hr * 9000 (lb/hr) = 6,750 lbs

*Total Fuel:* **20,750** lbs

*Fuel distribution:* equal in all tanks, when possible. If total fuel load is higher than 36,000 lbs, open all Cross-feed Valves, so that the engines feed only on the Center Tank. When the fuel level on the Center Tank reaches 12,000 lbs, set Cross-feed valves to their original position so that all the tanks provide fuel again.

- Consider that:
    - These calculations don't include tailwind/headwind corrections.
    - May vary if your payload differs greatly from 20,000 lbs.
    - May vary if your speed is not the standard value, or your cruise altitude is too low or too high.

## DEPARTURE CHART




We will takeoff from Runway 27 at Cincinnati, and immediately turn heading 274° during our initial climb out.

Then, we will make a left turn to intercept the CVG R-206 inbound (and then outbound) radial, until we are 45nm away from CVG at PONIE.

Before PONIE, we will turn right to intercept the IIU R-240 inbound radial, and then the IIU R-234 outbound radial for 29nm.

Finally, at SKINN, we will turn left to intercept the BWG R-196 inbound radial.

## ARRIVAL CHART


We'll fly the BWG R-175 outbound radial for 71nm to reach DRAKK.

Afterwards, we'll turn left to intercept the RMG R-146 inbound radial.

Finally, we'll turn left again to intercept the ATL R-133 inbound radial until DALAS (do not forget to comply with the altitude restriction at DALAS, as instructed in the original chart).

15nm out of ATL, we'll turn left heading 090° and descend to 6,000 ft.

# PRE-FLIGHT

You are at the gate of your choice. Make sure you have a Dark and Cold cockpit. Before powering up, complete the safety checks:

- Main panel, overhead and throttle quadrant:
  - Gear handle DOWN
  - Flap indicators AGREE
  - Flight Director OFF
  - Aileron/Elevator Hydraulics OFF
  - Window heat OFF
  - Start levers CUTOFF
  - Speedbrake DOWN
  - Flaps UP
  - Throttles IDLE

Now it's time to power up the aircraft:

- Battery subpanel:
  - Battery ON

- Main panel:
  - Altimeter SET
  - Flight Director CHECKED
  - Stabilizer Trim ZERO
  - HSI: set Course to 206°, the inbound/outbound CVG radial for our SID.

- Overhead:
  - Hydraulics SET
  - Yaw Dampers OFF
  - Emergency lights ARMED
  - NAV lights ON
  - Window heat OFF
  - Anti-ice OFF
  - Pitot Tube heat OFF

- Radio stack:
  - Radios & Navigation CHECKED
    - Set NAV1 frequency to 117.3 MHz (CVG)
    - Set NAV2 frequency to 112.4 MHz (ABB). It'll be your first crosscheck frequency.
    - We will not be using any ATC at the time, so leave both COMM frequencies alone.

- Fuel Panel:
  - Crossfeed valves - No. 1 and 3 CLOSED, No. 2 OPEN
  - Fuel Shutoff valves CLOSED

## BEFORE ENGINE START

Now we are ready to start the engines and pushback. A few steps are needed to accomplish this.

- Main panel:
  - Airspeed indicator bugs SET (click below 045 in the indicator, the bugs will be set automatically)
  - Altitude alert SET (set for our first level-up altitude, 10,000 ft)
  - EPR bugs SET (click the knob below the EPR indicators until the bug reads 2.03 for engines 1 and 3, and 2.05 for engine 2)

- Overhead:
  - Beacon lights ON
  - Passenger Signs ON
  - Continuous ignition ON

- Fuel panel:
  - All Fuel Shutoff valves OPEN


## ENGINE START

This will combine the Engine Starters from the overhead panel, the Start Levers from the throttle quadrant, and the N2 readings from the main panel. The sequence to follow is Engine 1 first, then 2, then 3. Repeat the next procedure for every engine:

- Engine Starter GROUND (click on the starter)
- N2 will rise. When it reaches 20%...
- Start Lever UP

## PUSHBACK AND TAXI

After engine start, turn on the Pitot tube heat, window heat (if required), exterior lights as needed, Anti-skid and Yaw Dampers checked, and deploy Flaps 15. Don't forget to set your Trim to a value near 5 (standard value, this can change depending on weight and balance). Start your pushback and taxi to Runway 27. Remember to keep the aircraft under 25 knots in straight line, and 15 knots in turns.

# TAKEOFF

Complete the Before Takeoff checklist. Position and hold. This is where things start to get busy in the cockpit of the 727, everything will happen very fast, and you must be prepared to navigate the aircraft, comply with the restrictions and handle everything by yourself.

The first thing to do is to set the Flight Director. Engage the FD and set it to HDG (assuming that you have already set the yellow bug in the HSI to 274° as instructed in the chart for our initial climbout; if you hadn't set the bug before, do it now). Set the pitch director too.

Start to advance the throttles to 60% and watch out for failures. After a few seconds, throttle up until EPR readings match the orange bugs you've already set. Build up some speed, and slowly rotate at 145 KIAS. Do not pull up very fast, the 727 is not a fast climber. You must build up speed first.

# DEPARTURE

After taking off, it's time to start climbing and turning left to begin our standard instrument departure. Retract the Gear and Flaps as needed, complying with the retraction speeds, and climb to 10,000ft maintaining a 250KIAS speed. Turn off Continuous Ignition in the overhead panel.

Remember: you are still flying by hand. Now we have to align our aircraft with the R-206 radial for CVG. Turn left and watch your HSI. If the middle line is offset to the left, bank left so that you can align the line to the white arrow. Same procedure for a right-side offset of the line: bank right. Don't forget that you, and only you, are controlling both lateral and vertical navigation. It's easy to lose track of your vertical speed when you are trying to align horizontally to the VOR radial. It's common to make mistakes, and it requires practice to master handflying.


Before reaching the CHCLL intersection, you should be very close to 10,000 ft, our first level-off altitude, and aligned on the radial. Slowly decrease your vertical speed, and maintain 10,000 ft. Turn off the necessary lights, adjust your thrust and accelerate to 310 KIAS.

Below this altitude, the 727 must be flown by hand; it was designed to be handflown. At 10,000 ft, you have two options: to continue flying by hand, or to engage the autopilot. It's a personal choice. For this tutorial's matters, we'll engage the autopilot by steps, in order to get you familiarized with its operation.

Set your EPR bugs to 2.08 for Engines 1 and 3, and 2.10 for Engine 2 (maximum climb EPR).

Open the radio stack, and engage the AIL lever. Then, rotate the Autopilot Mode knob to NAV/LOC. Your autopilot is now in control of you lateral navigation. But don't let go the yoke yet! You are still controlling your vertical navigation manually! Notice that there are now two green lights in the autopilot display: both say VOR/LOC.

Set your altitude alert to 29,000 ft (our cruise altitude), pull the yoke and start climbing again, trying to keep 310 KIAS.

***IMPORTANT***: Should you decide to climb by hand, do not forget about the Trim. The Trim is your friend, and it'll make things easier when climbing. Trim instead of pulling or pushing the yoke.

In short, you should be approaching the PONIE intersection. 10nm before PONIE, rotate the Autopilot Mode knob back to MAN, and change your NAV1 frequency to 114.8 MHz. Now go to the HSI and set the Course to 240° (IIU R-240 radial). DO NOT engage the NAV/LOC mode yet. Instead, when you are 6nm from PONIE, slowly turn the Pitch and Turn knob to the right, until the aircraft banks 10° to 20° to the right. Notice how the needle in the HSI aligns as you join

the R-240 radial for IIU. This manual alignment takes practice. When you are aligned in course, turn the Autopilot Mode back to NAV/LOC. The same procedure applies to any other change in VOR radial tracking. This is how you fly to and cross intersections without the use of an FMC.

## LEVEL-UP

You should try to keep a Mach 0.72 speed above FL220. Now we will try the vertical navigation autopilot. So set a stable climb rate by hand, and then go to your radio stack, and engage the ELEV lever. The autopilot is now fully activated. You can increase or decrease the climb rate using the Pitch and Turn controller knob.


At FL285, decrease your climb rate to 800 fpm or less, in order to reach FL290 slowly and stabilize the aircraft for cruise.

At FL290, engage the ALT HOLD switch in the Autopilot, and the ALT HOLD in the Flight Director.

You are now in the Cruise phase of the flight. At FL290, pull back your throttles until the burn rate (Fuel Flow) reads 3,000 PPH. This is the standard burn rate for the 727, and it should give you a good cruise velocity. Refer to the B727-200 Burn Rate Chart for standard rates vs. speeds.

Fly the rest of the SID and the STAR until the NEUTO transition. It's time to review our arrival procedures. We'll be performing an ILS approach to runway 26R at KATL. Right now would be a good moment to grab the chart and study it.

# DESCENT

There's an altitude restriction at DALAS on the RMG3 arrival. You must cross DALAS at 14,000 ft. Therefore, plan for a correct descent path after NEUTO. Set the altitude alert for 14,000 ft, complete the Descent Checklist, reduce your thrust as required, disengage the ALT HOLD switch in the autopilot, and pull up the Pitch controller knob until your descent rate indicates -2,500 fpm, or as needed.

Cross DALAS and continue flying towards ATL via the 133° radial. Disconnect the autopilot and fly by hand until you are 20nm out of ATL. At this point, turn left heading 090°. Descend to and maintain 6,000ft. Reduce your airspeed to 230 KIAS. Set the NAV1 frequency to be the ILS 26R frequency, 110.1 MHz, set the Course in the HSI, 272° according to the approach plate, and set the NAV2 frequency to be the ATL VOR, 116.9 MHz.

You are now on full control of the aircraft, setting up for an ILS approach. Notice the altitude restrictions on the plate: 6,000 at SMLTZ INT.

At 20nm DME2, perform a 180° turn to the right, in order to align and establish yourself on the localizer. You should be intercepting the LOC below the Glide Slope.

Switch the Flight Director mode to AUTO GS, and continue handflying the approach. Reduce your speed and deploy your flaps until Flaps 30 accordingly. Don't forget to set your lights and to turn on the seatbelt signs! Engage Continuous Ignition on the overhead too.

Your $V_{ref}$ for Flaps 30 will be 127 KIAS, and you can set the airspeed bugs by clicking on the lower part of the airspeed indicator. Notice: Flaps 30 is the standard setting to land a 727. Flaps 40 is reserved for short-field / high-altitude landings. Your approach should look like this:

Continue your final approach, and land the aircraft.

***IMPORTANT***: **DO NOT FLARE** the B727. This aircraft was not designed to flare upon touchdown. Instead, keep a steady approach speed; get the nose up 2 or 3 degrees, and the plane will land itself, nice and easy. If you flare, most likely you will float, lose airspeed and smash back on the ground; all that if you don't tail strike first.

50 ft off the ground, cut the throttles and let the plane touch down. When the main gear touches the ground, deploy spoilers, brake easily, and slow down.

Your touchdown should look like this:


CONGRATULATIONS! You have completed your first flight onboard of the Boeing 727 aircraft. Roll out, complete the After Landing Checklist, and taxi to the gate of your choice. This tutorial should give you a general idea of what it is like to fly this wonderful airplane.

# Checklists

## PREFLIGHT

| | |
|---|---|
| All Charts/Flight Plan | On Board |
| Weight/Balance | **Verify** Configuration |
| **V** speeds/Flap Settings | Calculate V speed card |
| Parking Brakes | **ON** |
| ACARS *(Optional)* | Connect Flight Start (Optional) |
| All doors (Outside View) | **VERIFY** Closed / Locked |
| Flight Controls (Outside View) | **Demonstrate** FREE & CLEAR |
| Battery | **ON** |
| Gear Lever | **VERIFY** 3 Green Down/Locked |
| Clock/Stopwatch | **VERIFY** SET |
| Panel Lights | **ON** |
| No Smoke/Seat Belts | **ON** |
| Fuel on board | **Document** Left/Center/Right |
| Avionics Master | **ON** |
| Pitot Heat | **OFF** |
| Anti-Skid | **TESTED, OFF** |
| Exit Lights | **ARMED** |
| COMM Radio | **TUNE** ATIS |
| Altimeter | **SET** |
| COMM Radio | **SET** |
| NAV Radio's | **SET IDENT** |
| ADF | **SET IDENT** |
| Marker Beacon | **ON** |
| HSI/CDI | **SET** (CRS) |
| Heading bug | **SET** (HDG) |
| TCAS | **TEST Standby** |
| Transponder | **SET** Code/**VERIFY** Squawk Standby |

**ATC CLEARANCE** - Call for IFR/VFR Departure

**-PREFLIGHT CHECKLIST COMPLETED-**

## BEFORE ENGINE START

| | |
|---|---|
| Window Heat | **As required** |
| Exterior Lights | **SET** |
| APU | **RUN** |
| Flight Instruments | **SET** |
| Hydraulics | **SET** |
| Takeoff Data | **CONFIRM** |
| Packs | **OFF** |
| Fuel Panel | **SET** |

**---Cleared to Push and Start---**

**-BEFORE ENGINE START CHECKLIST COMPLETED-**

## AFTER ENGINE START

| | |
|---|---|
| Packs | **ON** |
| Fuel pumps | **ON** |
| Pneumatic Pressure | **CHECK** |
| Hydraulics | **CHECK** |
| Flaps | **SET** |
| Trim Configuration | **SET** |
| Cabin | **SECURE** |

**-AFTER ENGINE START CHECKLIST COMPLETED-**

## TAXI

| | |
|---|---|
| Electrical Power | **ESTABLISHED** |
| No. 2 Bleeds | **OFF** |
| Yaw Dampers | **ON, CHECKED** |
| Controls | **FREE, CHECKED** |
| Takeoff Data | **CONFIRMED** |
| Briefing | **COMPLETE** |

**-TAXI CHECKLIST COMPLETED-**

## BEFORE TAKEOFF

| | |
|---|---|
| Fuel Panel | **CHECKED, PUMPS ON** |
| Continuous Ignition (overhead) | **ON** |
| Pressurization | **CHECKED** |
| Pitot Heat | **ON** |
| Anti-Skid | **ON** |
| APU | **OFF** |
| Flaps/Trim | **CHECKED** |
| Speedbrake | **DOWN** |
| Lights | **SET** |
| Bugs | **SET** |
| T/O Data | **CONFIRMED** |

**---Cleared for Takeoff---**

**-BEFORE TAKEOFF CHECKLIST COMPLETED-**

## AFTER TAKEOFF

| | |
|---|---|
| ○ Continuous Ignition (overhead) | **AS REQUIRED** |
| ○ Landing gear | **UP, LIGHTS OUT** |
| ○ Flaps | **UP, LIGHTS OUT** |
| ○ Landing Lights | **OFF** |
| ○ Fuel Panel | **CHECKED** |
| ○ Flight Director | **AS REQUIRED** |
| ○ Autopilot | **AS REQUIRED** |
| ○ Anti-ice/Window Heat | **AS REQUIRED** |

**-AFTER TAKEOFF CHECKLIST COMPLETED-**

## DESCENT

| | |
|---|---|
| ○ Pressurization | **CHECKED** |
| ○ Trim | **SET** |
| ○ Speedbrake | **AS REQUIRED** |
| ○ Hydraulics | **CHECKED** |
| ○ Fuel Panel | **CHECKED** |

**-DESCENT CHECKLIST COMPLETED-**

## APPROACH

| | |
|---|---|
| ○ Altimeter | **SET** |
| ○ Radios | **SET** |
| ○ Speedbrake | **DOWN** |
| ○ Flaps | **SET** |
| ○ Landing Data | **BUGS SET, CHECKED** |
| ○ Landing Lights | **SET** |
| ○ Hydraulics | **CHECKED** |
| ○ Fuel Panel | **CHECKED, PUMPS ON** |
| ○ Cabin Signs | **ON** |

**-APPROACH CHECKLIST COMPLETED-**

## LANDING

| | |
|---|---|
| Gear | **DOWN, 3 GREEN** |
| Flaps | **30°/ 40°** |
| Speedbrake | **ARMED** |
| Landing Data | **BUGS SET, CHECKED** |
| Landing Lights | **SET** |
| Anti-skid | **ON** |
| Yaw Dampers | **OFF** |
| Anti-ice | **OFF** |
| Continuous Ignition | **ON** |
| Hydraulics | **CHECKED** |
| Fuel Panel | **CHECKED, PUMPS ON** |
| Cabin Signs | **ON** |

**-LANDING CHECKLIST COMPLETED-**

## AFTER LANDING

| | |
|---|---|
| Flaps | **UP** |
| Speedbrake | **DOWN** |
| Landing Lights | **OFF** |
| Anti-skid | **OFF** |
| Continuous Ignition | **OFF** |
| Hydraulics | **CHECKED** |
| Fuel Panel | **SET** |
| APU | **START** |
| Radios, Transponder | **STBY** |

**-AFTER LANDING CHECKLIST COMPLETED-**

## PARKING

| | |
|---|---|
| Parking brake | **SET** |
| Cabin Signs | **OFF** |
| Start Levers | **CUTOFF** |
| Electrical power | **SET** |
| Fuel panel | **AS REQUIRED** |
| Hydraulics | **AS REQUIRED** |

**-PARKING CHECKLIST COMPLETED-**

# Crew Take-Off Briefing

**Captain to Co-pilot**

We will be taking off on RWY (*active runway*), climbing to (*altitude*). If we encounter an engine malfunction, fire or other emergency before **$V_1$** (critical engine failure recognition speed) KIAS, the flying pilot will retard the throttles to flight idle and bring the aircraft to a complete stop on the runway. The non flying pilot will notify the proper ATC of our intentions and assist the flying pilot as requested or needed to operate the aircraft in a safe manner.

If the aircraft has reached **$V_r$** KIAS, the flying pilot will fly the aircraft per company procedures and the non flying pilot will notify the appropriate ATC of our intentions and assist the flying pilot as requested or needed to operate the aircraft in a safe manner and land the aircraft as soon as possible.

Aircraft Weight is: _____ Taxi Instructions to Active: _____

V Speeds for this flight are (*calculated*) See prepared Flip Chart(s)

Flap Settings: Takeoff _____ Engine Failure Approach _____

Discuss the Departure Procedures for this flight (Ref Charts, SIDs)

Discuss Weather considerations (Ref ATIS, METAR, TF)

# Crew Approach/Landing Briefing

**Captain to Co-pilot**

Weather conditions are (*obtain from ATIS, METAR and TF*).

Landing on RWY (*active runway*) at (airport) using the (____) approach (Ref STAR)

Descend at (_____). Our Final Approach altitude will be (____)

**V** Speeds for this approach are (*calculated*) (See prepared Flip Chart(s))

Missed approach Procedures are (Ref Approach Plates)

Taxiway Turnoff _____ Taxi Route from Active _____

Parking at Gate (___)

# Crew Announcements

- Departure
  "Ladies and gentlemen, on behalf of the flight crew, this is your (*captain or first officer*) (*insert name*), welcoming you aboard Delta Virtual Connection flight number (*flight*) with service to (*destination*). Or flight time today will be approximately (*time en route*) to (*destination*). At this time, I'd like to direct your attention to your to the monitors in the aisles for an important safety announcement. Once again, thank you for flying Delta Virtual Connection."

- Climbing above 10,000 feet MSL
  Inform cabin crew that use of approved electronic devices is authorized.

- At Cruise Altitude
  "Ladies and gentlemen, this is the (*Captain or First Officer*) speaking. We've reached our cruising altitude of (altitude). We should be approximately (*time*) enroute and expect to have you at the gate on time. I've turned off the fasten seatbelt sign, however, we ask that while in your seat you keep your seatbelt loosely fastened as turbulence is often unpredicted. Please let us know if there is anything we can do to make your flight more comfortable, so sit back and enjoy your flight."

- Approach
  Inform cabin crew of approach and to discontinue use of electronic devices.

- Landing
  "On behalf of Delta Virtual Connection and your entire flight crew we'd like to welcome you to (*destination*) where the local time is (*time*). We hope you've enjoyed your flight with us today and hope that the next time your plans call for air travel, you'll choose us again. Once again, thank you for flying Delta Virtual Connection."

# Appendix
# B727-200 Charts

### Fuel Burn

| Altitude | Indicated Airspeed (KIAS) | True Airspeed (KIAS) | Fuel Burn (PPH) |
|---|---|---|---|
| Ground Ops | N/A | N/A | 2,000 |
| 12,000’ | 280 | 325 | 2,800 |
| FL180 | 290 | 370 | 3,000 |
| FL240 | 290 | 400 | 3,000 |
| FL300 | 280 | 430 | 2,900 |
| FL360 | 270 | 460 | 2,800 |

### Maximum Flap Speeds

| Flap Position | Maximum Speed |
|---|---|
| 2 | 230 KIAS |
| 5 | 215 KIAS |
| 15 | 205 KIAS |
| 25 | 185 KIAS |
| 30 | 185 KIAS |
| 40 | 175 KIAS |

### Climb Profile

| Speed | Altitude |
|---|---|
| $\mathbf{V}_2$ + 10 KIAS | 1,000 ft AFE |
| 200 KIAS | 2,500 ft AFE |
| 250 KIAS | 10,000 ft |
| .72 mach | Cruise Alt |
| .78 mach | Level Cruise |

### Standard Climb Rate

| FPM | Altitude |
|---|---|
| 2700 | Below 10,000 feet |
| 2000 | 10,000 to15, 000 feet |
| 1500 | 15,000 to FL200 |
| 1100 | Above FL200 |

### Descent Rate

| Target Speed | Descent Rate | With Flight Spoilers |
|---|---|---|
| 310 KIAS | -2500 fpm | -4500 fpm |
| 250 KIAS | -1700 fpm | -2500 fpm |
| **V**ref 30 + 80 KIAS | -1100 fpm | -2200 fpm |

### Approach/Landing Speeds

| Speed | Altitude | Distance from Airport |
|---|---|---|
| 220 KIAS | Below 10,000 feet | 30 nm |
| 200 KIAS | | 24 nm |
| 170 KIAS | | 15 nm |
| **V**ref + 5 | Varies | Final Approach Fix |
| **V**ref + 5 @ 45 Flaps | Landing | Runway Threshold |

## LANDING FLAPS SPEEDS VS. WEIGHT

| Speed | Altitude | Distance from Airport |
|---|---|---|
| 220 KIAS | Below 10,000 feet | 30 nm |
| 200 KIAS | | 24 nm |
| 170 KIAS | | 15 nm |
| **V**ref + 5 | Varies | Final Approach Fix |
| **V**ref + 5 @ 45 Flaps | Landing | Runway Threshold |

**Flaps 30 Vref Speeds**

| **Weight (x1000 lbs)** | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
|---|---|---|---|---|---|---|---|---|---|
| **Vref (KIAS)** | 112 | 114 | 117 | 120 | 122 | 125 | 127 | 130 | 135 |

**Flaps 40 Vref Speeds**

| **Weight (x1000 lbs)** | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
|---|---|---|---|---|---|---|---|---|---|
| **Vref (KIAS)** | 108 | 110 | 113 | 115 | 119 | 122 | 124 | 127 | 130 |

*Note:

- Flaps 30: Normal OPS. Use when landing under normal conditions.

Flaps 40: High-altitude, Short-runway OPS. Use when low speed approaches are required.

# Acknowledgements and Legal Stuff



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Flight Simulator screenshots courtesy David Eugenio Gomez, DVA1933.



While we strive to mirror real-world operations, this manual is not designed for use in the operation of real-world aircraft.

**NOT FOR REAL WORLD AVIATION USE**