

Canadian Virtual Airlines

Aircraft Operating Instructions

Airbus Industries A319/320/321 Series

Preface

This document has been prepared to help CVA members with basic procedures to successfully operate the Airbus Industries 319/320/321 series aircraft in FS2002 and 2004. There are 2 types of flight simulator pilots: those that like to jump in, engines running, file GPS direct and go, and those that prefer (like myself) to start with a cold-and-dark cockpit, research their flight planned route, plan a realistic fuel load and conduct a more realistic experience. This training document has various benefits for both types of flightsim pilots.

I am not a licensed private or commercial pilot. I am an aviation enthusiast and dedicated flight simulator addict and have been since the early days of Microsoft Flight Simulator Five and 086 processors with monochrome screens. I am a Naval Officer with extensive experience in HMC Ships and Submarines after beginning my military career in the Army.

Tom McCall, CVA39 Check Pilot

The airframes we will be discussing in this document are two very good renditions of the "Bus."

Freeware: International Flightsim Design Group (IFDG)
Airbus A320 <http://www.ifdg.net>.

Payware: Phoenix Simulations
<http://www.phoenix-simulation.co.uk/>

They are both outstanding models, each having advantages and disadvantages. The PSS version (developed for FS2002 and updated for FS2004) will mirror more closely the real characteristics of the Airbus, while the IFDG comes a close second and is ideally suited to the "get-in-and-go" pilot as well as the neophyte.

This AOI has been created as a CVA company procedures and tutorial document. **This is not a definitive flying document for the B737.** If you require more information with procedures contained in this document feel free to contact either the author of this document or another senior member of the CVA staff for clarification. The CVA forums are also an excellent source of information on aircraft operations and other flight simulation related topics. If you are a real world Airbus PIC, any tips, notes or pointers would be greatly appreciated.

This manual is divided into the following sections:

1. Aircraft
2. Pre-Flight
3. Start and Taxi
4. Take Off and Climb
5. Enroute
6. Descent
7. Approach
8. Appendix

1. Aircraft

While the A319/320/321 Series of aircraft are not likely to surpass the Boeing 737 family in service numbers, it is safe to say that the introduction of these aircraft and their wide acceptance by airlines, pilots and passengers has caused Boeing executives to rethink how they do business. They are widely used in Europe, Asia as well as North and South America.

Perhaps the most important contributor to Airbus Industrie's success as an aircraft manufacturer, the four member A320 family is a significant sales success and a technological trailblazer. The 150 seat A320 is the foundation and best selling member of the family.

The A320 is perhaps best known as the first airliner to introduce a fly-by-wire flight control system - where control inputs from the pilot are transmitted to the flying surfaces by electronic signals rather than mechanical means. Apart from a small weight saving, the advantage of Airbus' fly-by-wire is that as it is computer controlled, an inbuilt flight envelope protection makes it virtually impossible to exceed certain flight parameters such as G limits and the aircraft's maximum and minimum operating speeds and angle of attack limits.

Also integral to the A320 is the advanced electronic flightdeck, with six fully integrated EFIS colour displays and innovative sidestick controllers rather than conventional control columns. The A320 also employs a relatively high percentage of composite materials compared to earlier designs. Two engines are offered, the CFM56 and IAE V2500.

The initial production version was the A320-100, which was built in only small numbers before being replaced by the definitive A320-200 (certificated in November 1988) with increased max takeoff weight, greater range and winglets.

Powerplants: two 111.2kN to 120.1kN (25-27,000lb) CFM International CFM56-5A1 turbofans or 118kN (26,500lb) CFM56-5A3s or 120kN (27,000lb) -5B4s, or two 113.4kN (25,500lb) International Aero Engines IAE V2500-A1 or 117.9kN (26,500lb) V2527-A5s.

Performance: A320-200 - Max cruising speed 903km/h (487kt) at 28,000ft, economical cruising speed 840km/h (454kt) at 37,000ft. Range with 150 passengers and reserves with CFM56s 4843km (2615nm), or 5639km (3045nm), or 5278km (2850nm); with V2500s 4874km (2632nm) or optionally 5463km (2950nm) or 5676km (3065nm).

Weights: A320-200 - Operating empty with V2500s 42,220kg (93,079lb); with CFM56s 42,175kg (92,980lb). Standard max takeoff for both versions 73,500kg (162,040lb) or optionally 75,500kg (166,445lb) or 77,000kg (169,755lb).

Dimensions: wing span 34.09m (111ft 10in), length 37.57m (123ft 3in), height 11.76m (38ft 7in). Wing area 122.6m² (1319.7sq ft).

Capacity: flightcrew of two. Main cabin can accommodate a maximum of 179 passengers in a high density layout. Typical two class seating arrangement for 12 passengers at four abreast and 138 at six abreast. Seven LD3 derived LD3-46 containers or palletised cargo can be stored in the underbelly forward (four) and rear (three) freight holds.

2. Pre-Flight

Prior to commencing any flight every aviator will have determined a departure point, a planned route and a destination (along with an alternate, should bad weather arise). Flight sim enthusiasts vary in their immersion into the hobby, from flying exact real world flightplans coinciding with actual departure times, passenger loads, fuel and weather, to those that jump in and "let 'er go". This manual will provide you with a "middle ground" that should offer a reasonable balance between entertainment and challenge.

We will assume that you are flying a standard CVA company route, commencing with a "cold and dark" flightdeck and will be flying online with squawkbox and the VATSIM network.

Your pre-flight paperwork should include:

- ◆ the departure **airport diagram**
- ◆ the SID (**standard instrument departure**) (if applicable) filed or likely to be assigned
- ◆ your flightplanned route
- ◆ the STAR (**standard terminal arrival**) filed or likely to be assigned
- ◆ approach plates for the destination airport
- ◆ the destination **airport diagram**

- ◆ Have a pencil/pen and paper to write ATC clearances/instructions as issued

Setting up your Flight Simulator:

- ◆ start your flight program, select the A320 model, set the date/time, departure airport and choose medium gate position, not an active runway.
- ◆ start weather generation software (if req'd)
- ◆ conduct a fuel/weight and balance check
- ◆ start the squawkbox software (tutorials on installing and running SB are available at the CVA academy site) . **DO NOT CONNECT TO THE NETWORK.**
- ◆ open the flight plan window and fill in appropriate fields
- ◆ squawk standby in SB
- ◆ connect to the VATSIM network, and immediately PING server and resend flightplan
- ◆ contact ATC (if available) to request clearance:

"Pearson Clearance Delivery, good afternoon, CanadianXXX with information FOXTROT, request IFR clearance to Chicago O'Hare."

"CanadianXXX is cleared to Chicago O'Hare via AVRO5 departure, climb and maintain 5000', expect FL320 10 minutes after departure. Departure on 128.8. Push and start pilot discretion, call Pearson tower when ready for taxi"

- ◆ It is important to copy the clearance as issued by ATC on your notepad to ensure a correct readback. Make note of any changes in the assigned clearance from the flightplan you submitted, and query ATC if unsure. Always have a pen or pencil ready.
- ◆ enter your flightplan route in the MCDU if flying PSS A320
- ◆ set transponder to assigned code
- ◆ set your altitude limiter for the SID altitude
- ◆ adjust NAV waypoints for any changes to route or for SID departure

You should be now ready to commence pre-start checks. Captains will normally call for engine start after receiving their clearance from ATC. ATC will usually authorize pushback and start on receipt of a correct flight clearance readback. After a successful start and pushback, you will be required to contact ATC for taxi clearance to the departure runway

3. Start and Taxi

For detailed information on the PSS A320, refer to the excellent operating guidelines contained in the Phoenix Simulations documents folder.

- ◆ conduct engine start IAW with appropriate flightsim model direction and pushback from the dock a suffi-

cient distance to permit your aircraft to turn as you begin to move toward the assigned taxiway.

- ◆ you should have both your aircraft position light and red rotating beacon on when starting/idling
- ◆ ensure you have a clear warning panel before proceeding with your flight. The only warning light that should be illuminated post start is the parking brake indication.
- ◆ set your NAV and COMM radio frequencies as required for departure
- ◆ ensure your altimeter is set to station pressure
- ◆ contact online ATC (if available) and request taxi clearance:

“Pearson Ground, good morning, CanadianXXX ready for taxi to runway 33R for departure”

“CanadianXXX, taxi to and hold short Rwy 33R via AJ, A”

- ◆ readback the taxi clearance
- ◆ review assigned taxi clearance on airport diagram
- ◆ if other aircraft are present and online ATC is not available make a general broadcast on UNICOM freq 122.800 stating your intentions:

“Toronto traffic, CanadianXXX, taxiing via A, V to Rwy 33R for departure to the west”

- ◆ turn on taxi light
- ◆ release brakes (make note of time for PIREP)
- ◆ advance throttles and start a slow forward roll
- ◆ test braking to ensure systems are operating normally
- ◆ taxi to the active runway, do not exceed 25 knots speed while taxiing

4. Take off and Climb

Upon reaching the hold short line or once you are in position for the departure runway as directed by ATC:

“Pearson Tower, CanadianXXX, holding short Rwy 33R”

- ◆ turn off taxi lights, turn on flare/approach lights
- ◆ select strobes ON
- ◆ select wing insp lights ON
- ◆ turn on weather radar (if fitted)
- ◆ select mode C on Squawkbox and aircraft transponder
- ◆ set flaps to takeoff (iaw weight tables in operating manual)
- ◆ get takeoff clearance from ATC, and readback before advancing throttles:

“CanadianXXX, Pearson Tower, winds 340 at 13, altimeter 29.98, climb and maintain 5000’ runway heading, contact Toronto Departure through 1000’, cleared to takeoff Rwy 33R”

Readback ATC instruction before advancing throttles.

“CanadianXXX check weather, climb and maintain 5000’ on runway heading, contact Toronto departure passing 1000’, cleared to takeoff Rwy 33R, CanadianXXX, roger”

If ATC is not available, and other traffic is in the area, inform of your intentions on UNICOM, 122.8:

“Pearson traffic, CVA39 departing Rwy 33R to the west”

- ◆ advance the throttles smoothly for takeoff until reaching approximately 60% N1
- ◆ when engines have stabilized and before aircraft has reached 80 kts, advance throttles to takeoff power
- ◆ monitor engine gauges closely during takeoff roll
- ◆ rotate smoothly at predetermined Vr speed from weight/balance calculations

GW	Stall Speeds for Takeoff and Landing					
	Flap Position					
	0	1	1+F	2	3	Full
170	179	140	134	125	124	121
160	170	136	130	120	119	113
150	161	132	125	116	115	113
140	154	127	119	112	111	109
130	144	121	115	108	107	105
120	138	116	110	104	103	101
110	132	111	105	99	98	96
100	126	106	100	95	94	92
90	119	100	95	90	89	87
80	114	95	90	85	84	82

- ◆ once you have verified a positive rate of climb select gear up
- ◆ flaps should be retracted according the flap retraction schedule. During flap retraction, do not select the next flap setting until the aircraft has accelerated beyond the stated airspeed for the next flap setting
- ◆ if a turn is required during the climbout, do not begin banking until the aircraft has climbed at least 200 feet AGL. Between 200 AGL and 400 AGL do not exceed bank angles of 15°.
- ◆ through 1000 AGL contact ATC as directed:

“Toronto Departure, CanadianXXX with you through 1000’ for 5000’, runway heading”

“CanadianXXX, Toronto Departure, radar identified through 1200’, turn right to heading 360, climb and maintain 8000”

- ◆ select wing insp lights OFF
- ◆ establish 300 kias climb profile (250 kias below 10000’ AGL in USA) between 2000-2600 fpm, unless otherwise directed by ATC
- ◆ engage autopilot no earlier than 1000 AGL
- ◆ set ALT SEL mode (reset altitude when cleared by ATC)
- ◆ set IAS (180) mode
- ◆ set HDG or NAV mode as required to follow flightplanned route
- ◆ fly assigned SID profile
- ◆ through 10,000 ASL select flare/approach lights OFF
- ◆ through 10,000 ASL select passenger lights OFF
- ◆ through 10,000 ASL set IAS (290) as required for climb
- ◆ through FL180 set altimeter to standard pressure 29.92 inches
- ◆ reaching flightplanned altitude smoothly level off and set appropriate cruise speed (M0.70)
- ◆ once clear of the terminal area, Departure will hand you off to
- ◆ if above FL290, RVSM requirements dictate that you notify ATC (if available) at assigned altitude:

“Toronto Centre, CanadianXXX is level FL320”

5. Enroute

- ◆ monitor aircraft systems to ensure ops normal
- ◆ monitor fuel consumption
- ◆ monitor weather at destination and alternate aerodromes
- ◆ plan approach procedure based on prevailing winds at the destination, standard procedures for destination airport and/or consultation with ATC
- ◆ program any variations deviations in STAR arrival into SB and/or aircraft FMS
- ◆ provide enroute ICING/TURBULENCE PIREPS to ATC as required
- ◆ monitor TCAS closely, especially in uncontrolled airspace
- ◆ monitor SB online ATC and verify whether you enter controlled airspace while enroute
- ◆ contact ATC 10-20 miles before penetrating his airspace
- ◆ private msg (.msg CVAXXX) your friends or other CVA pilots to say hello. If no ATC online, maintain a listening watch on rw.avsim.net/cva for company traffic

6. Descent

- ◆ determine top-of-descent (TOD) point
- ◆ prior to TOD point request descent from ATC (if available)

“CanadianXXX, Chicago centre, at pilot’s discretion you are cleared to descend to cross PULLMAN VOR at 14000’ speed 250 knots, expect the ILS Rwy 14, O’Hare altimeter 30.11”

If no online ATC, and Servinfo/SB TCAS indicate traffic in the area, make a general broadcast on UNICOM, 122.800:

“Chicago area traffic, CanadianXXX, type A320 crossing FLINT VOR, leaving FL320 on the PULLMAN4 arrival, planning ILS Rwy 14L”

The basic calculation for rate of descent is 3 times your altitude +10 ie: at FL200 (20 X 3 = 60) +10 = 70 start a 1500fpm descent at 70 miles from destination

- ◆ monitor descent rate to level at your initial approach fix (IAF) altitude approximately 20 miles from destination
- ◆ monitor speeds/angle of attack during descent
- ◆ where speed brakes are used to control speed, they should be closed before thrust is added
- ◆ comply with ATC/STAR routing restrictions as appropriate
- ◆ below FL180 ensure altimeter set to local station pressure
- ◆ on reaching 10,000 ASL, ensure speed is 250kts IAS or less, set flaps as called for in descent schedule
- ◆ below 10,000 ASL select passenger switches ON
- ◆ below 10,000 ASL select flare/approach lights ON
- ◆ nav radios set for approach
- ◆ study approach chart and review missed approach procedures.

7. Approach

Proper planning and preparation is the key to a successful (and uneventful) approach. Aircrew workload increases with proximity to the runway. Approach and landing information should be checked and validated prior to 10,000 ASL

Entering the terminal area, ATC (if available) will hand you to Approach Control:

“CanadianXXX, contact O’Hare Approach on 119.0, good day”

Change frequency and contact ATC as directed:
“O’Hare Approach, CanadianXXX with you”

“CanadianXXX, O’Hare Approach, good afternoon, turn right heading 345, vectors for the ILS 14L approach”

Readback all ATC instructions

- ◆ plan to be level at the initial approach fix (IAF) altitude and established clean 200kias (gear/flaps up) approximately 10 miles from the IAF
- ◆ in areas of moderate or above turbulence/chop reduce to a max of 180kias
- ◆ ATC may request a higher speed due to traffic

Now things are really going to get busy, be prepared, don’t get flustered, because you still have plenty of time to do everything. When you intercept the ILS glideslope notify ATC that the localizer is active. ATC will hand you off to Tower:

“CanadianXXX, contact O’Hare Tower on 135.4, good day”

Change frequency, take a look around the cockpit, take a deep breath, after all, you’re on the ILS:

“O’Hare Tower, CanadianXXX with you, on the ILS Rwy 14L”

“CanadianXXX, O’Hare Tower, winds 165 at 15, altimeter 30.11, cleared to land Rwy 14L”

Read back the landing clearance.

- ◆ 1000 AGL on an instrument approach, set landing configuration (gear down and flaps iaw schedule), set autobrake and spoilers
- ◆ final check that you are on descent profile (ILS Localizer and glide slope Speed within 5 knots of target REF speed)
- ◆ throttles set to maintain speed and rate of descent
- ◆ if short field landing set maximum flaps
- ◆ upon passing final approach fix (FAF) reduce to appropriate final approach speed
- ◆ if flying a LOC - LOC(BC), ILS if either localizer or glideslope needle reaches full deflection in either direction immediately carry out a missed approach
- ◆ avoid any “drastic’ manoeuvres while in this full “dirty’ configuration

If using the autopilot to track the approach, disconnect autopilot when:

- ◆ airport environment in sight
- ◆ 500.AGL
- ◆ carrying out a MAP (missed approach) procedure.

“O’Hare Tower, CanadianXXX, clear rwy 14L via P4”

“CanadianXXX, O’Hare Tower, welcome to Chicago, contact Ground on 121.9”

Max Flaps/Slats (Vfe)						
Model	Position	1	1+F	2	3	Full
A319/320	Vfe	230*	215*	200*	185*	177*
A321	Vfe	235*	225*	215*	195*	190*
*KIAS						

Change frequency, contact ground (if available):

“O’Hare Ground, CanadianXXX with you, clear Rwy 14L, taxi to the gate”

“CanadianXXX, O’Hare Ground, squawk standby, taxi to gate of your choice via P, H.”

- ◆ readback instructions
- ◆ Complete **After Landing** Check
- ◆ Taxi to the CVA assigned parking area (if available)

At the gate, inform ATC you are shutting down:

“O’Hare Ground, CanadianXXX is at the gate, shutting down, thank you and good day”

“CanadianXXX, O’Hare Ground, flightplan closed 2132Z, thanks for flying Chicago ARTCC, good day”

Engage parking brake (record flighttime for PIREP).

- ◆ Complete the **Shutdown** Check
- ◆ Remove cap from pop/beer/vodka bottle and enjoy the beverage.
- ◆ go to CVA website, file your PIREP.

Canadian Virtual Airlines

A319/320/321 Checklist

Safety Check

Landing Gear Lever Down
Engine Master Switches Off

Start Checklist

Logbook Checked
Circuit Breakers Normal
Inertial Nav System NAV
Oxygen On
Emergency Lights Armed
Pressurization Auto
Engine/Wing Anti-Ice Off
Air Conditioning Set
Electrical Set
Hydraulics Set
Fire Pushbuttons In
Instruments Flags Normal
Altimeters Set
ECAM (systems monitors) Doors Checked
Fuel Check .. Release Min/Check Fuel On Board
Anti-Skid/Nose Wheel Steering On
Gear Down & Green
Switching Normal
Takeoff Warning Checked
Engine Master Switches Off
MCDU Set

Final Items Before Gate Departure

ADIRS Align Lights Out
Beacon On
Fuel Pumps Auto & On
Sliding Windows Both Locked
Doors All Green, Slides Armed

Before Taxi Check

Engine/Wing Anti-Ice As req'd
ECAM Status Checked
Wave Off Received

Takeoff Check

Allowable Takeoff Weight Checked
Flaps Set Flap 1+F, Green
or 3+F, Green
Trim Set
APU Off
Controls Free & Normal
Thrust Mode Take Off (Flex Set)
V Bug + ____ Kts Checked and
Set

Final Takeoff Items

Packs (Air Conditioning) On (Off)
Takeoff Memo All Green
Engine Mode Selector Ignition
Flaps Set 1+F or 3+F
Transponder Code Set, Auto

Climb Check

Landing Lights Retract
Packs On
Gear Up
Engine Mode Selector Normal (Ignition)
Flaps Up
Speed Brakes Disarmed

At 18,000 ft MSL

Altimeter Standard (29.92 or 1013)

Descent Check

Pressurization Checked
Allowable Landing Weight Checked

Approach Check (10,000')

Altimeters Set
V Bug + ____ kts Set
ECAM Status Checked
Approach Briefing (IFR/VFR) Complete

Landing Check

Approach Freq & Courses Set
RADIO ALTIMETER Set
Altimeter Set
Auto Brakes Armed
Engine Mode Selector Ignition
Missed Approach Procedure Checked

Final Landing Items

Gear Down
Flaps Set Flap 3+F
or Config. FULL
Speed Brakes Armed

After Landing Check

Landing Lights Retract
Engine/Wing Anti-Ice Off
Engine Mode Selector Normal
Flaps Up
Speed Brakes Disarmed
Radar Off

Approaching The Gate

APU Start

After Parking At Gate

ADIRS Off
Oxygen Off
Exterior Lights Nav On
APU Bleed Off
Integral Lights Off
Transponder Standby
Emergency Exit Lights Off
APU Master Switch Off
Battery 1 & 2 Off