PROJECT OPENSKY
CRJ-900
Readme

WEIGHT AND BALANCE, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT & LANDING

Disclaimer

The CRJ-900 is a very new aircraft. Information on this airplane is extremely limited. The visual model was created using Bombardier 3-D drawings and existing photos.

The flight dynamics model was based on previous experience from limited Bombardier CRJ-900 specs, the CRJ-100/-200 project, various photos, scraps of available information, and many assumptions as a heavier CRJ-700.

The CRJ-900 may not be entirely accurate, and has not be verified by a CRJ-900 pilot as we figure at the time of print, there are less than 20 – 30 of them anywhere in the world.

If you are a CRJ-700 or -900 pilot and would like to provide feedback, please contact us at the forums at: www.projectopensky.com. We'd love to hear from you.

WARNING

Pay particular attention to this readme file and the CRJ manual for proper operations.

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Project Opensky
Bombardier Canadair Regional Jet -- CRJ-900 Series
Version 2004.8.0

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WEIGHT AND BALANCE

1) The Opensky CRJ-900 now uses the FS2004 Weight and Balance entries. Failure to properly balance the aircraft will cause it to become unstable and crash.

2) The balance of aircraft and definitions of the weight stations are as follows:
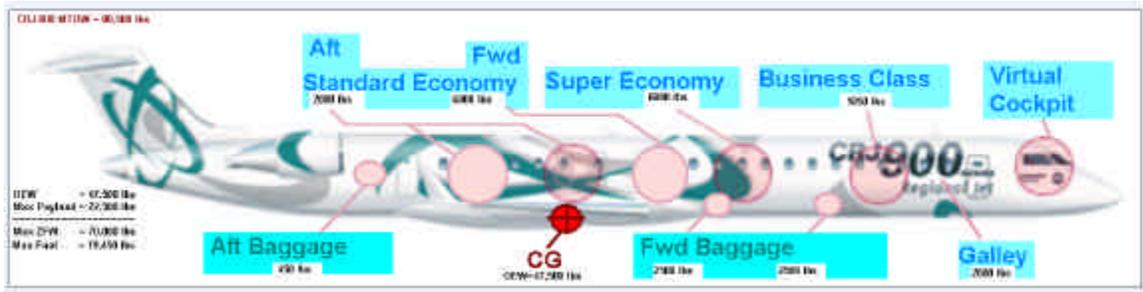
3) **When you first load the airplane into FS2004**, it will automatically assume 100% full fuel in each tank. **You will be over the airplane Max Takeoff Weight limit (MTOW):**

This setup represents all available weight for 86 passengers, their baggage, gallery layout, **and** full fuel. To reach the airplanes max carrying capacity, or max range, there is a tradeoff:

- More payload, less fuel, less range (86 pax & baggage, only 10,000 lbs fuel,   790 nm range)
- Less payload, more fuel, more range (57 pax & baggage, all 19,500 lbs fuel, 1,498 nm range)

4) For perfectly balanced flight at Max TOW, takeoff with only 10,000 lbs fuel in the tanks (5000 left tank, 5000 right tank). When you load the airplane, it will be automatically trimmed neutral at trim=7.0 degrees (0.0 for panels with 0-based trim ranges).

Max Payload Option – Approx 790 nm, 86 PAX

FUEL AND PAYLOAD

Project Opensky CRJ-900

☑ Display fuel quantity as weight

Empty weight	47500 Pounds
Payload	22500 Pounds
Fuel	10001.47 Pounds
Gross weight	80001 Pounds
Max. gross weight	80500 Pounds
Max. allowable fuel	10500.00 Pounds

Change Fuel...   Change Payload...

HELP   CANCEL   OK
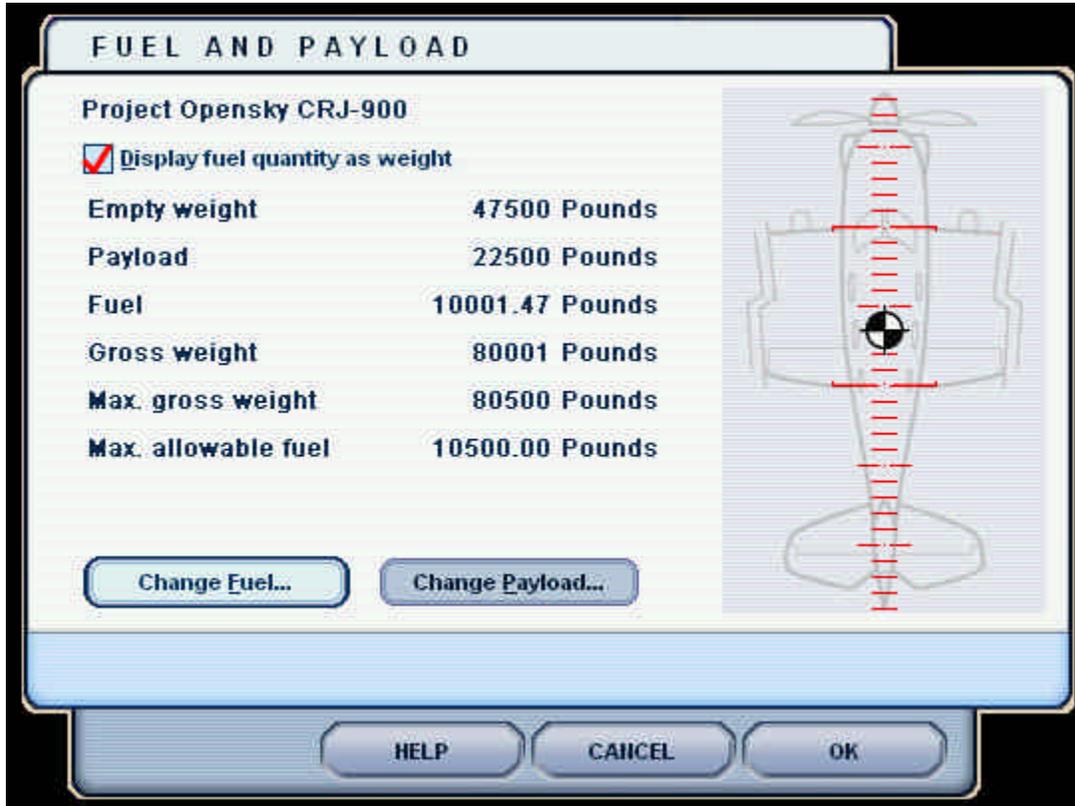
5) For longer range flights, reduce the payload, **and trim to the appropriate range**. So for example, for a flight with 56 passenger and their baggage for the full 1,498 nm, trim to position 5.9 degrees (-1.5 nose down trim for panels with 0-based trim ranges):

Max Range Option – Approx 1,498 nm, 56 PAX

6) I was told that the international standard for calculating weight for passengers and baggage is as follows:

- 175 lbs per passenger
- 70 lbs baggage per passenger

7) When loading the aircraft, remember to load weight evenly, and as far forward as possible.

8) Sorry, as the CRJ-900 is new, I do not have a trim chart for every possible weight combination. In general, you will trim between 7 – 9.5 on takeoff (0.0 to about -2.5 degrees nose down).

TAXI

1) 1-engined taxi is recommended. At the lower gross weights, the CRJ will pick up quite an amount of speed. It will accelerate at idle thrust.

2) Remember, it is okay to taxi over the MTOW with slightly too much fuel if you anticipate burning up that fuel taxiing before your takeoff roll. Take approximate 500 lbs extra fuel over TOW for max range flights.

3) For 90 degree turns, slow to 8 – 12 knots, making sure yaw damper is disabled.

4) The CRJ-900 is a stretched aircraft, so when turning, remember to allow enough distance for turning your main gear without running off the taxiway.

5) Do not exceed 20 – 30 knots on taxi.

TAKEOFF

1) Remember to restart the second engine, if on 1-engine taxi.

2) Make sure you are trimmed to takeoff position.

3) Recommended takeoff flap position is position 8.

4) If you expect high crosswinds on takeoff, turning on yaw damper is recommended.

5) Only increase power to 85% - 88%N1 on the takeoff roll. That is sufficient power. Typically CRJs use longer lengths on the runway while derating takeoff thrust and preserving engine life. If the field is extremely short, increase to 92% N1.

6) Do not rotate more than 8 degrees to avoid tailstrike.

CLIMB

1) **For normal economy climb**, follow ATC speed restrictions of 250 KTS below 10,000 FT. If permitted by ATC and no speed restriction below 10,000 FT, increase speed to 290 KTS. Above 10,000 FT, climb at 290 KTS or .80 MACH. Climb speed table is as follows:

ALTITUDE	SPEED
Sea Level to 10,000 FT	250 KTS
Above 10,000 FT	290 KTS/.80 MACH

2) **Max climb speed** is 290 knots until reaching .80 MACH at initial cruise altitude.

CRUISE

1) **Cruise** at .80 MACH.

2) **Hi-speed** cruise at .83 @ fuel burn penalty.

3) **Typical cruise altitude** high 20,000s to mid 30,000 FLs.

4) **Assumed Fuel burn is** 2300 pph per engine at FL330.

5) Trim aircraft for proper elevator alignment.

6) In case of engine out cruise, trim rudder for directional alignment.

DESCENT

1) Descend at pre-determined TOD (Top of Decent)

2) Descend at 274 KT above 10,000 FT.

3) Use speedbrakes or thrust to minimize vertical path error.

4) Proper descent planning is necessary to ensure proper speed and altitude at the arrival point. Distance required for descent is 3NM/1000FT. Descent rates are as follows:

Intended Speed	Decent Rate	
	CLEAN	WITH SPEEDBRAKES
.80 MACH/274KTS	2300 FPM	5500 FPM
250 KTS	1400 FPM	3600 FPM
VREF 30 + 80 KTS	1100 FPM	2200 FPM

5) In the event of engine out approach, approach at VREF+5 @ flaps 30.

6) Under normal conditions **land at VREF @ flaps 45.** (For Appendix A for reference cards.)

7) The Project Opensky CRJ is a CATII aircraft, meaning the aircraft is capable of landing on autopilot in conditions where visibility is down to 50ft AGL.

8) Land the aircraft. At average gross weights, at full flaps @ VREF, the CRJ will have a 0 to +2 degree nose up pitch. When landing the aircraft, flare to +2 - +3 degrees nose up.

Project Opensky Bombardier CRJ-900 – Frequently Asked Questions

Q) When I takeoff, the nose pitches high into the air and the airplane stalls. What did I do wrong?

A) You did not properly balance the airplane and/or trim for takeoff. Please see weight and balance section of this readme.

Q) The CRJ-100/-200 lands with the nose pointed down, but the CRJ-900 is flat, is that correct?

A) Yes. It appears that the CRJ-900 landing angle is quite flat, only about 0 to 2 degrees nose up.

Q) Why is this weight and balance COG not sometimes completely in the center of the FS2004 loading tool?
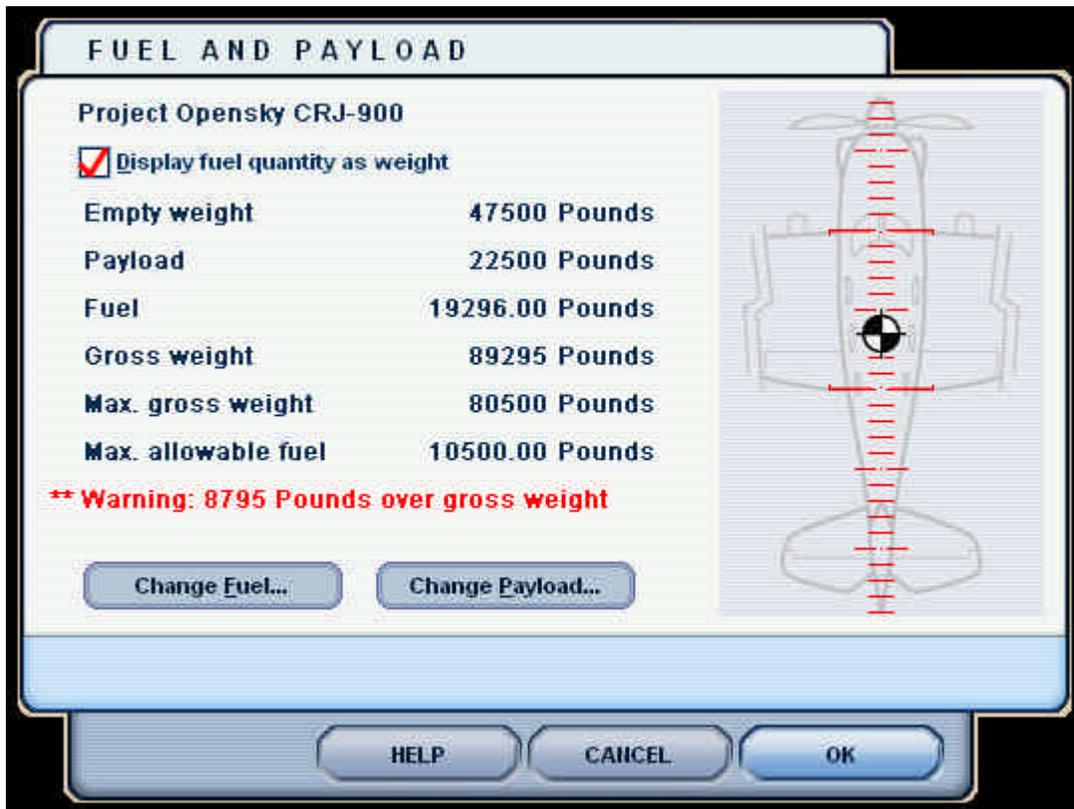
A) Actually, this picture is not entirely accurate for aircraft who have their wings and main CG areas further aft. See the weight and balance section of this manual to see where the CG is actually located. This picture is a PA-28 or Mooney.

Q) Got any speed reference cards?

A) Well, yes and no. See Appendix A for some speedcards I was able to piece together, but remember, they may not be entirely accurate.

Q) I just want to fly. What do I do?

A) Load the CRJ-900, put in only 10,000 lbs fuel, and fly.

Typical routes are short, Phoenix -- Salt Lake City, Phoenix – San Diego, etc.

APPENDIX A

Speed reference cards

<Note:> These speed cards are simplified and do not take into account SL or temp changes. Not to be used for real-world navigation.

Project Opensky					
Canadiar Regional Jet					
65,000 lbs					
Takeoff					
Flaps 8			Flaps 20		
Vr	125		Vr		
V2	136		V2		
Vfto					
Landing					
Flaps	0°	8°	20°	30°	45°
Maneuvering					
Vref					125

Project Opensky
Canadiar Regional Jet
70,000 lbs

Takeoff					
Flaps 8			Flaps 20		
Vr	131		Vr		
V2	139		V2		
Vfto					

Landing					
Flaps		0°	8°	20°	30°	45°
Maneuvering						
Vref						128

Project Opensky

Canadiar Regional Jet

75,000 lbs

Takeoff					
Flaps 8			Flaps 20		
Vr	137		Vr		
V2	145		V2		
Vfto					

Landing					
Flaps		0°	8°	20°	30°	45°
Maneuvering						
Vref						132

Project Opensky

Canadiar Regional Jet

80,000 lbs

Takeoff					
Flaps 8			**Flaps 20**		
Vr	143		Vr		
V2	151		V2		
Vfto					

Landing					
Flaps	0°	8°	20°	30°	45°
Maneuvering					
Vref					138

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