



AIRCRAFT **TRADING FLOOR**

737-500 / CFM56-3C1

Aircraft Characteristics and Performance

Apollo Aviation Group

Jerry Reyes – Technical Services Manager

October 2008

D906Q3874

737-500 performance analysis



Study aircraft:

- 737-500 – Apollo Aviation Group provided configuration
 - MTOW = 122,500-lb / CFM56-3C1 engines (20,000-lb thrust)
 - 2 class interior with 104 seats (8 C / 96 Y)
 - OEW = 69,213-lb

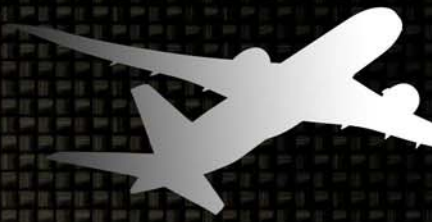
Aircraft analysis summary:

- payload range capability
- fuel burn summaries (as a function of range) for
 - weight limit payload = 33,287-lb
 - 70% weight limit payload = 23,300-lb (73 passengers and 7,970-lb cargo)
 - 100% passenger payload = 21,840-lb
 - 0 payload
- range capability from Arequipa (AQP), Cuzco (CUZ), and Juliaca (JUL)
 - 100% and 70% passenger load factors
 - airport analysis – includes annual ADM temperatures
 - latest runway definitions from ICAO/ Jeppesen, which includes
 - elevation, runway length, and slope
 - obstacles, clearway and stopway (if applicable)

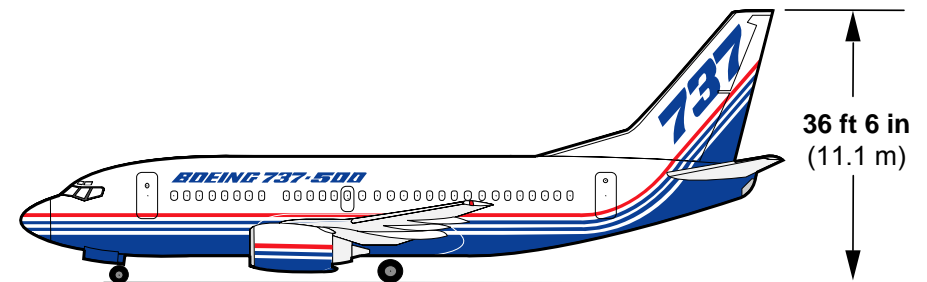
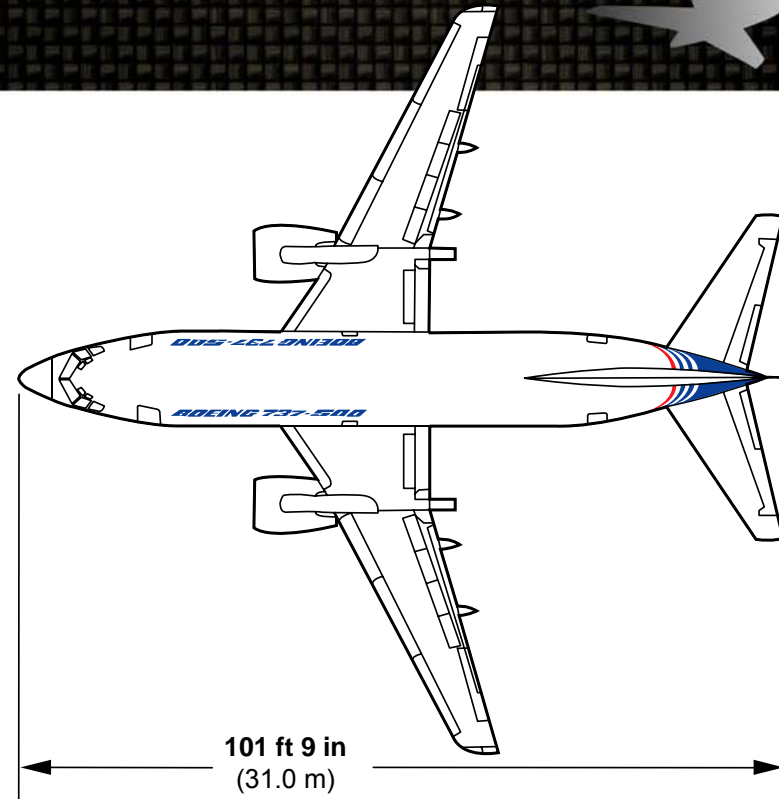
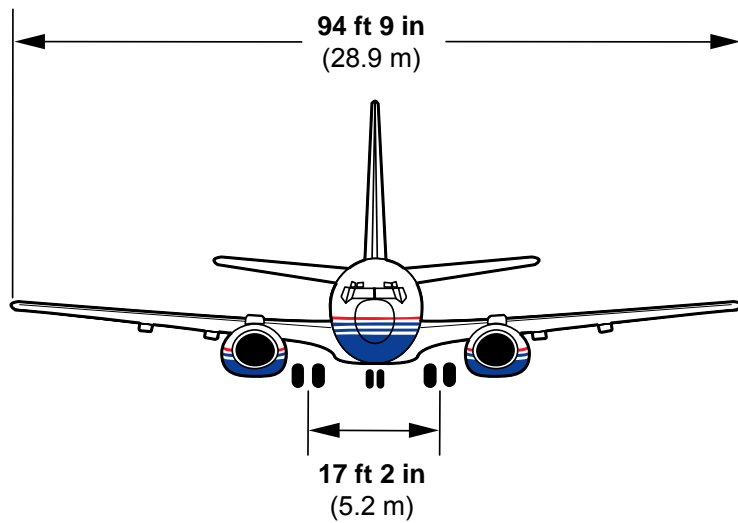
Boeing typical performance ground rules

- nominal performance plus 2% fuel burn markup
- fuel density = 6.5-lb per US gallon
- passenger and baggage weight = 210-lb

General arrangement

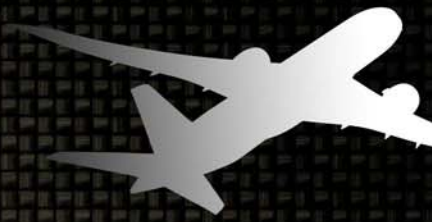


737-500



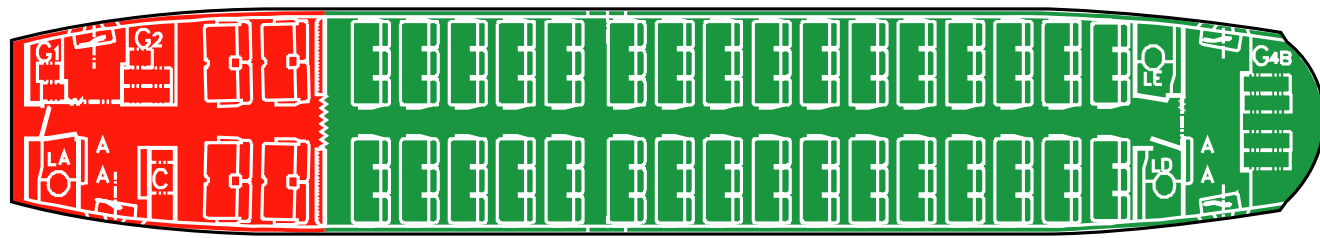
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737-500 interior arrangement – dual class



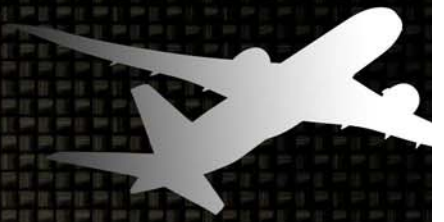
Generic dual class layout

737-500
8 first at 38-in pitch
96 economy at 32-in pitch

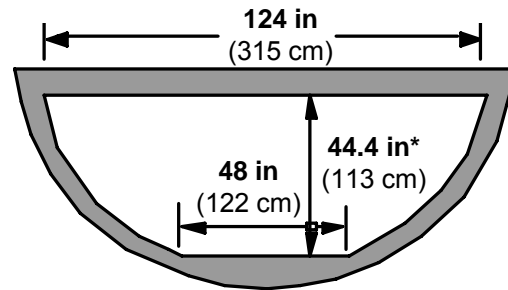


104 passengers

737 lower hold volume

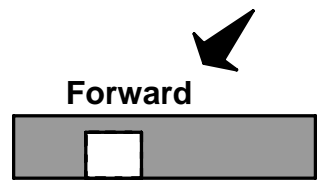
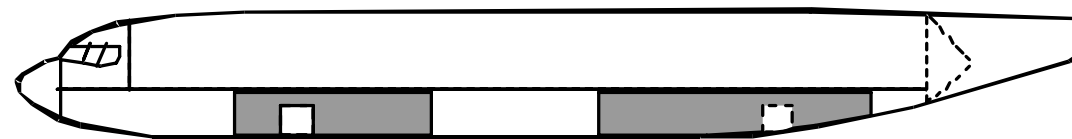


737-300/-400/-500



Total volume

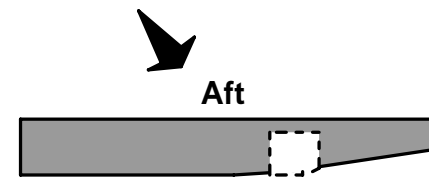
- 737-300 = 1,068 ft³ (30.2 m³)**
- 737-400 = 1,373 ft³ (38.9 m³)**
- 737-500 = 822 ft³ (23.3 m³)**



Forward

Door 35 in x 48 in
(89 cm x 122 cm)

- 737-300 = 425 ft³ (12.0 m³)**
- 737-400 = 607 ft³ (17.2 m³)**
- 737-500 = 287 ft³ (8.1 m³)**



Aft

Door 33 in x 48 in
(84 cm x 122 cm)

- 737-300 = 643 ft³ (18.2 m³)**
- 737-400 = 766 ft³ (21.7 m³)**
- 737-500 = 535 ft³ (15.2 m³)**

*47.1 in (120 cm) forward end of aft compartment

CFM56-3C1 engine characteristics



737-300/-400/-500

- The same engine can be used for all three models
- The price of the engine is based on the thrust rating purchased
- Thrust available for each airplane model is as follows:



	Basic	Option
737-300	20,000-lb SLST	22,000-lb SLST
737-400	22,000-lb SLST	23,500-lb SLST
737-400 HGW	22,000-lb SLST	23,500-lb SLST
737-500	18,500-lb SLST	20,000-lb SLST



AIRCRAFT **TRADING FLOOR**



737-500 / CFM56-3C1

Payload Range, Fuel Burn, and Range Capability

October 2008

D906Q3874

Aircraft characteristics summary

737-500 with CFM56-3C1 engines

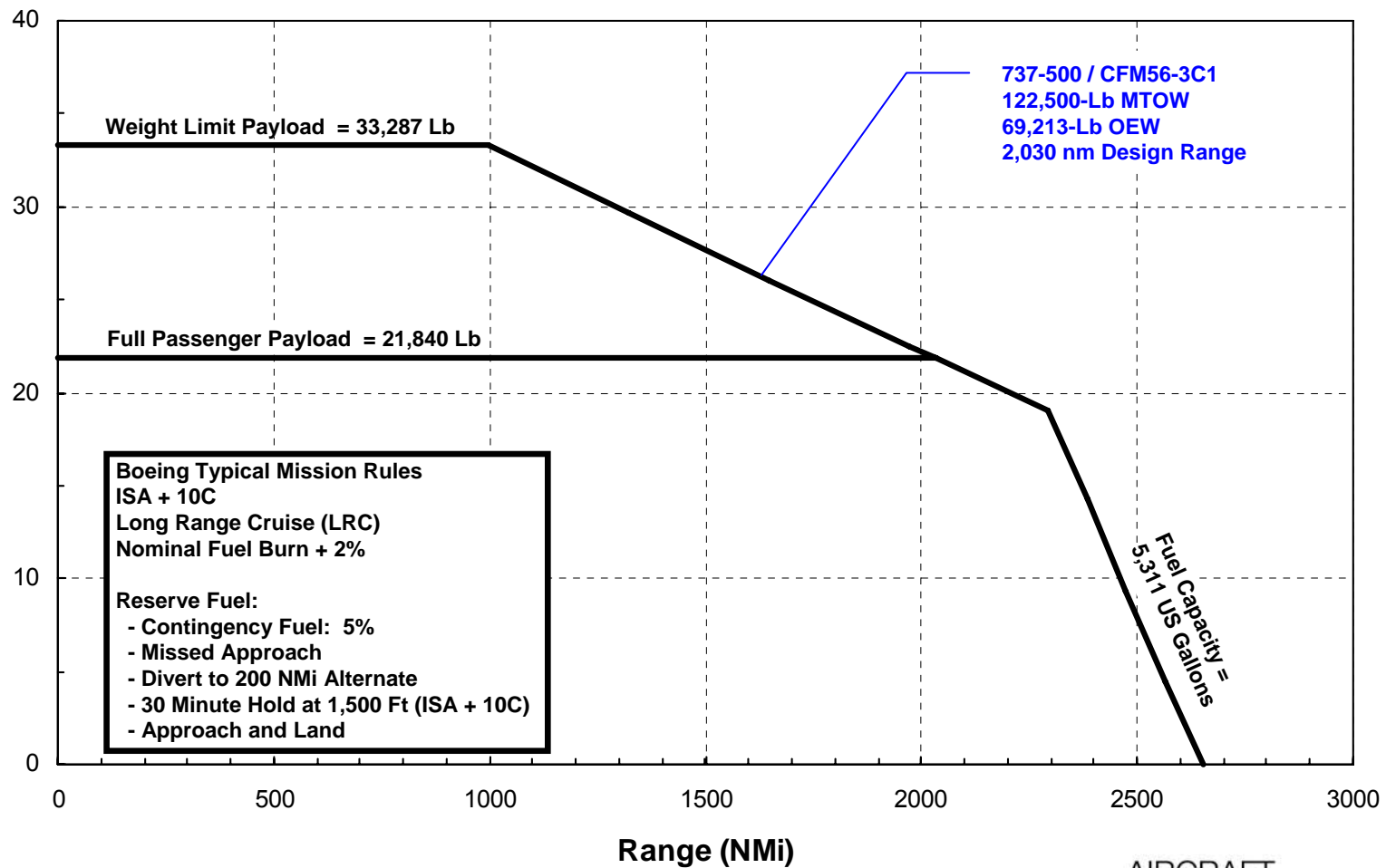


<u>Aircraft</u>	737-500
Engines	CFM56-3C1
Thrust (Lb)	20,000
<hr/>	
<u>Aircraft Design Weights (Lb)</u>	
Maximum Taxi Weight	123,000
Maximum Takeoff Weight	122,500
Maximum Landing Weight	110,000
Maximum Zero Fuel Weight	102,500
Operator Empty Weight	69,213
<u>Design Capacities</u>	
Interior Layout - Dual Class	104
Below Floor Volume (Cu Ft)	
- Bulk	822
Total	822
Fuel (US Gallons)	5,311
Fuel (Lb @ 6.5 Lb / US Gal)	34,522
<u>Payloads (Lb)</u>	
Weight Limit Payload	33,287
100% Passenger Payload (210-lb per Pax)	21,840
Cargo at Weight Limit Payload - Full Pax	11,447
<u>Design Range (NMI)</u>	
100% Passenger Payload	2,030

737-500 payload range summary



Payload (1,000 Lb)



737-500 – 122,500-lb MTOW

fuel burn matrix – weight limit payload



APOLLO AVIATION GROUP 737-500 - 122,500-LB MTOW - FUEL BURN MATRIX - WEIGHT LIMIT PAYLOAD CFM56-3C1 ENGINES - 104 PASSENGERS NOMINAL PERFORMANCE + 2% MARKUP		Max Taxi Wt: 123,000 lb Max TO Wt: 122,500 lb Max Land Wt: 110,000 lb Max Zero Fuel Wt: 102,500 lb Op Empty Wt: 69,213 lb Fuel Capacity: 5,311 gallons Fuel Wt: 34,522 lb @ 6.50 lbs/gal	<u>Payloads</u> Structural Pld: 33,287 lb Study Pld: 33,287 lb Passenger Seats: 104 @ 210 lb ea Psgr & Bags Pld: 21,840 lb Rev Cargo: 11,447 lb
Aircraft: 737-500 Engine: CFM56-3C1(20K)		Interior: 104 Passengers	
<small>737-500 PayloadRange-BaseCase / 737-500 / CFM56-3-B1-20 / D6-38199-REVB / 9/30/08 15:13:40</small>			

Route	Dist (nm)	ESAD (nm)	Cruise Altitude (1000 ft)	0 Wind (knots)	Cruise Delta Temp (°C)	Cruise Proc	Block Time (hrs)	Takeoff Weight (lb)	Landing Weight (lb)	Block Fuel (lb)	Reserve Fuel (lb)	Total Fuel (lb)	Psgr	Cargo (lb)	Total Payload (lb)	Limit
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Fuel Burn Matrix - 100 Nautical Mile Increments - Weight Limit Payload

ORIG - DEST	100	100	10	0	10	LRC	0.65	111,230	108,780	2,850	6,280	8,987	104	11,447	33,287	P/L
ORIG - DEST	200	200	20	0	10	LRC	0.91	112,684	108,849	4,235	6,348	10,440	104	11,447	33,287	P/L
ORIG - DEST	300	300	26	0	10	LRC	1.13	113,939	108,909	5,430	6,409	11,696	104	11,447	33,287	P/L
ORIG - DEST	400	400	31	0	10	LRC	1.35	115,071	108,962	6,509	6,462	12,828	104	11,447	33,287	P/L
ORIG - DEST	500	500	35	0	10	LRC	1.59	116,148	109,013	7,535	6,513	13,905	104	11,447	33,287	P/L
ORIG - DEST	600	600	35	0	10	LRC	1.82	117,399	109,073	8,726	6,573	15,156	104	11,447	33,287	P/L
ORIG - DEST	700	700	35	0	10	LRC	2.04	118,663	109,133	9,930	6,633	16,420	104	11,447	33,287	P/L
ORIG - DEST	800	800	35	0	10	LRC	2.27	119,941	109,194	11,146	6,694	17,698	104	11,447	33,287	P/L
ORIG - DEST	900	900	35	0	10	LRC	2.50	121,230	109,257	12,373	6,756	18,986	104	11,448	33,287	P/L
ORIG - DEST	1,000	1,000	35	0	10	LRC	2.73	122,500	109,287	13,613	6,817	20,287	104	11,417	33,257	MTOW
ORIG - DEST	1,100	1,100	35	0	10	LRC	2.96	122,500	108,160	14,740	6,834	21,431	104	10,273	32,113	MTOW
ORIG - DEST	1,200	1,200	35	0	10	LRC	3.18	122,500	107,042	15,858	6,851	22,566	104	9,138	30,978	MTOW
ORIG - DEST	1,300	1,300	35	0	10	LRC	3.41	122,500	105,932	16,968	6,868	23,694	104	8,011	29,851	MTOW
ORIG - DEST	1,400	1,400	35	0	10	LRC	3.64	122,500	104,829	18,070	6,829	24,756	104	6,948	28,788	MTOW
ORIG - DEST	1,500	1,500	35	0	10	LRC	3.87	122,500	103,734	19,166	6,847	25,870	104	5,834	27,674	MTOW
ORIG - DEST	1,600	1,600	35	0	10	LRC	4.09	122,500	102,646	20,254	6,868	26,979	104	4,725	26,565	MTOW
ORIG - DEST	1,700	1,700	35	0	10	LRC	4.32	122,500	101,565	21,335	6,890	28,082	104	3,622	25,462	MTOW
ORIG - DEST	1,800	1,800	35	0	10	LRC	4.55	122,500	100,491	22,409	6,914	29,180	104	2,524	24,364	MTOW
ORIG - DEST	1,900	1,900	35	0	10	LRC	4.78	122,500	99,423	23,477	6,937	30,271	104	1,433	23,273	MTOW
ORIG - DEST	2,000	2,000	35	0	10	LRC	5	122,500	98,360	24,540	6,959	31,356	104	348	22,188	MTOW

737-500 – 122,500-lb MTOW

fuel burn matrix – 70% weight limit payload



APOLLO AVIATION GROUP 737-500 - 122,500-LB MTOW - FUEL BURN MATRIX - 70% WEIGHT LIMIT PAYLOAD CFM56-3C1 ENGINES - 104 PASSENGERS NOMINAL PERFORMANCE + 2% MARKUP		Max Taxi Wt: 123,000 lb Max TO Wt: 122,500 lb Max Land Wt: 110,000 lb Max Zero Fuel Wt: 102,500 lb Op Empty Wt: 69,213 lb Fuel Capacity: 5,311 gallons Fuel Wt: 34,522 lb @ 6.50 lbs/gal	<u>Payloads</u> Structural Pld: 33,287 lb Study Pld: 33,287 lb Passenger Seats: 104 @ 210 lb ea Psgr & Bags Pld: 21,840 lb Rev Cargo: 11,447 lb
Aircraft: 737-500	Interior: 104 Passengers		
Engine: CFM56-3C1(20K)			
737-500 PayloadRange-BaseCase / 737-500 / CFM56-3-B1-20 / D6-38199-REVB / 9/30/08 15:13:40			

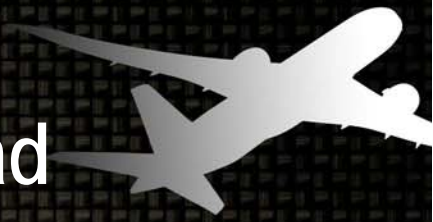
Route	Dist (nm)	ESAD (nm)	Cruise Altitude (1000 ft)	0 Wind (knots)	Cruise Delta Temp (°C)	Cruise Proc	Block Time (hrs)	Takeoff Weight (lb)	Landing Weight (lb)	Block Fuel (lb)	Reserve Fuel (lb)	Total Fuel (lb)	Psgr	Cargo (lb)	Total Payload (lb)	Limit
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Fuel Burn Matrix - 100 Nautical Mile Increments - 70% Weight Limit Payload

ORIG - DEST	100	100	12	0	10	LRC	0.65	100,722	98,414	2,708	5,900	8,465	73	7,970	23,300	P/L
ORIG - DEST	200	200	20	0	10	LRC	0.91	102,126	98,479	4,046	5,966	9,870	73	7,970	23,300	P/L
ORIG - DEST	300	300	28	0	10	LRC	1.13	103,226	98,532	5,094	6,019	10,970	73	7,970	23,300	P/L
ORIG - DEST	400	400	35	0	10	LRC	1.35	104,162	98,573	5,989	6,064	11,910	73	7,970	23,300	P/L
ORIG - DEST	500	500	35	0	10	LRC	1.58	105,324	98,634	7,090	6,119	13,066	73	7,970	23,300	P/L
ORIG - DEST	600	600	35	0	10	LRC	1.81	106,485	98,687	8,198	6,174	14,229	73	7,970	23,300	P/L
ORIG - DEST	700	700	35	0	10	LRC	2.04	107,657	98,742	9,314	6,230	15,401	73	7,970	23,300	P/L
ORIG - DEST	800	800	35	0	10	LRC	2.26	108,837	98,798	10,439	6,286	16,582	73	7,970	23,300	P/L
ORIG - DEST	900	900	35	0	10	LRC	2.49	110,026	98,854	11,572	6,343	17,772	73	7,970	23,300	P/L
ORIG - DEST	1,000	1,000	35	0	10	LRC	2.72	111,224	98,910	12,713	6,400	18,970	73	7,970	23,300	P/L
ORIG - DEST	1,100	1,100	35	0	10	LRC	2.95	112,432	98,968	13,864	6,457	20,179	73	7,970	23,300	P/L
ORIG - DEST	1,200	1,200	35	0	10	LRC	3.18	113,652	99,026	15,026	6,515	21,398	73	7,970	23,300	P/L
ORIG - DEST	1,300	1,300	35	0	10	LRC	3.41	114,883	99,085	16,198	6,574	22,629	73	7,970	23,300	P/L
ORIG - DEST	1,400	1,400	35	0	10	LRC	3.64	116,127	99,146	17,381	6,633	23,872	73	7,970	23,300	P/L
ORIG - DEST	1,500	1,500	35	0	10	LRC	3.86	117,383	99,206	18,577	6,693	25,127	73	7,970	23,300	P/L
ORIG - DEST	1,600	1,600	35	0	10	LRC	4.09	118,651	99,267	19,784	6,753	26,395	73	7,970	23,300	P/L
ORIG - DEST	1,700	1,700	35	0	10	LRC	4.32	119,933	99,328	21,004	6,814	27,676	73	7,970	23,300	P/L
ORIG - DEST	1,800	1,800	35	0	10	LRC	4.55	121,227	99,390	22,236	6,876	28,970	73	7,970	23,300	P/L
ORIG - DEST	1,900	1,900	35	0	10	LRC	4.78	122,500	99,423	23,477	6,937	30,271	73	7,943	23,273	MTOW
ORIG - DEST	2,000	2,000	35	0	10	LRC	5	122,500	98,360	24,540	6,959	31,356	73	6,858	22,188	MTOW

737-500 – 122,500-lb MTOW

fuel burn matrix – 100% passenger payload



APOLLO AVIATION GROUP 737-500 - 122,500-LB MTOW - FUEL BURN MATRIX - 100% PASSENGER PAYLOAD CFM56-3C1 ENGINES - 104 PASSENGERS NOMINAL PERFORMANCE + 2% MARKUP		Max Taxi Wt: 123,000 lb Max TO Wt: 122,500 lb Max Land Wt: 110,000 lb Max Zero Fuel Wt: 102,500 lb Op Empty Wt: 69,213 lb Fuel Capacity: 5,311 gallons Fuel Wt: 34,522 lb @ 6.50 lbs/gal	<u>Payloads</u> Structural Pld: 33,287 lb Study Pld: 33,287 lb Passenger Seats: 104 @ 210 lb ea Psgr & Bags Pld: 21,840 lb Rev Cargo: 11,447 lb
Aircraft: 737-500 Engine: CFM56-3C1(20K)		Interior: 104 Passengers	
<small>737-500 PayloadRange-BaseCase / 737-500 / CFM56-3-B1-20 / D6-38199-REVB / 9/30/08 15:13:40</small>			

Route	Dist (nm)	ESAD (nm)	Cruise Altitude (1000 ft)	0 Wind (knots)	Cruise Delta Temp (°C)	Cruise Proc	Block Time (hrs)	Takeoff Weight (lb)	Landing Weight (lb)	Block Fuel (lb)	Reserve Fuel (lb)	Total Fuel (lb)	Psg	Cargo (lb)	Total Payload (lb)	Limit
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Fuel Burn Matrix - 100 Nautical Mile Increments - 100% Passenger Payload

ORIG - DEST	100	100	12	0	10	LRC	0.65	99,204	96,911	2,693	5,858	8,408	104	0	21,840	P/L
ORIG - DEST	200	200	20	0	10	LRC	0.91	100,597	96,976	4,020	5,924	9,802	104	0	21,840	P/L
ORIG - DEST	300	300	28	0	10	LRC	1.13	101,684	97,028	5,056	5,976	10,889	104	0	21,840	P/L
ORIG - DEST	400	400	35	0	10	LRC	1.35	102,609	97,069	5,940	6,020	11,817	104	0	21,840	P/L
ORIG - DEST	500	500	35	0	10	LRC	1.58	103,760	97,129	7,031	6,075	12,963	104	0	21,840	P/L
ORIG - DEST	600	600	35	0	10	LRC	1.81	104,911	97,182	8,129	6,130	14,116	104	0	21,840	P/L
ORIG - DEST	700	700	35	0	10	LRC	2.04	106,072	97,237	9,235	6,185	15,277	104	0	21,840	P/L
ORIG - DEST	800	800	35	0	10	LRC	2.26	107,241	97,292	10,349	6,241	16,447	104	0	21,840	P/L
ORIG - DEST	900	900	35	0	10	LRC	2.49	108,418	97,347	11,471	6,297	17,625	104	0	21,840	P/L
ORIG - DEST	1,000	1,000	35	0	10	LRC	2.72	109,604	97,403	12,601	6,353	18,812	104	0	21,840	P/L
ORIG - DEST	1,100	1,100	35	0	10	LRC	2.95	110,800	97,460	13,740	6,410	20,008	104	0	21,840	P/L
ORIG - DEST	1,200	1,200	35	0	10	LRC	3.18	112,006	97,517	14,889	6,468	21,213	104	0	21,840	P/L
ORIG - DEST	1,300	1,300	35	0	10	LRC	3.40	113,222	97,575	16,047	6,525	22,429	104	0	21,840	P/L
ORIG - DEST	1,400	1,400	35	0	10	LRC	3.63	114,451	97,635	17,216	6,584	23,657	104	0	21,840	P/L
ORIG - DEST	1,500	1,500	35	0	10	LRC	3.86	115,690	97,695	18,396	6,643	24,896	104	0	21,840	P/L
ORIG - DEST	1,600	1,600	35	0	10	LRC	4.09	116,942	97,755	19,587	6,703	26,147	104	0	21,840	P/L
ORIG - DEST	1,700	1,700	35	0	10	LRC	4.32	118,206	97,815	20,791	6,763	27,411	104	0	21,840	P/L
ORIG - DEST	1,800	1,800	35	0	10	LRC	4.55	119,484	97,876	22,007	6,824	28,688	104	0	21,840	P/L
ORIG - DEST	1,900	1,900	35	0	10	LRC	4.78	120,774	97,938	23,236	6,885	29,978	104	0	21,840	P/L
ORIG - DEST	2,000	2,000	35	0	10	LRC	5	122,078	98,000	24,477	6,947	31,282	104	0	21,840	P/L

737-500 – 122,500-lb MTOW fuel burn matrix – zero payload



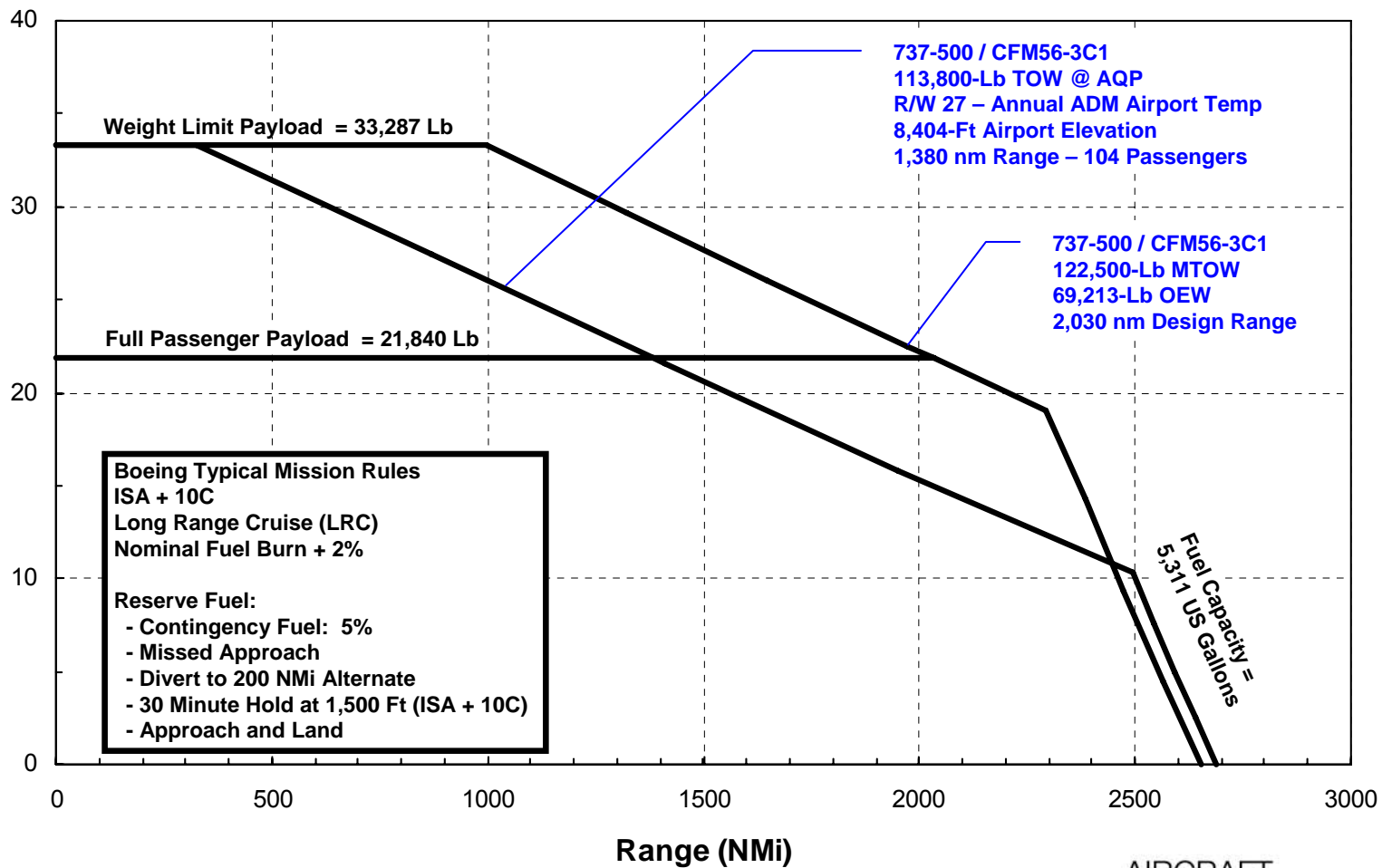
APOLLO AVIATION GROUP 737-500 - 122,500-LB MTOW - FUEL BURN MATRIX - ZERO PAYLOAD CFM56-3C1 ENGINES - 104 PASSENGERS NOMINAL PERFORMANCE + 2% MARKUP		Max Taxi Wt: 123,000 lb Max TO Wt: 122,500 lb Max Land Wt: 110,000 lb Max Zero Fuel Wt: 102,500 lb Op Empty Wt: 69,213 lb Fuel Capacity: 5,311 gallons Fuel Wt: 34,522 lb @ 6.50 lbs/gal	<u>Payloads</u> Structural Pld: 33,287 lb Study Pld: 33,287 lb Passenger Seats: 104 @ 210 lb ea Psgr & Bags Pld: 21,840 lb Rev Cargo: 11,447 lb
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Route	Dist (nm)	ESAD (nm)	Cruise Altitude (1000 ft)	0 Wind (knots)	Cruise Delta Temp (°C)	Cruise Proc	Block Time (hrs)	Takeoff Weight (lb)	Landing Weight (lb)	Block Fuel (lb)	Reserve Fuel (lb)	Total Fuel (lb)	Psg	Cargo (lb)	Total Payload (lb)	Limit
Fuel Burn Matrix - 100 Nautical Mile Increments - Zero Payload																
ORIG - DEST	100	100	14	0	10	LRC	0.66	76,452	74,412	2,439	5,198	7,495	0	0	0	P/L
ORIG - DEST	200	200	24	0	10	LRC	0.92	77,592	74,463	3,528	5,253	8,639	0	0	0	P/L
ORIG - DEST	300	300	31	0	10	LRC	1.14	78,508	74,506	4,402	5,297	9,556	0	0	0	P/L
ORIG - DEST	400	400	35	0	10	LRC	1.36	79,366	74,547	5,219	5,338	10,413	0	0	0	P/L
ORIG - DEST	500	500	35	0	10	LRC	1.6	80,364	74,598	6,166	5,385	11,408	0	0	0	P/L
ORIG - DEST	600	600	35	0	10	LRC	1.83	81,363	74,643	7,119	5,433	12,409	0	0	0	P/L
ORIG - DEST	700	700	35	0	10	LRC	2.07	82,369	74,690	8,079	5,481	13,417	0	0	0	P/L
ORIG - DEST	800	800	35	0	10	LRC	2.30	83,382	74,738	9,044	5,529	14,430	0	0	0	P/L
ORIG - DEST	900	900	35	0	10	LRC	2.54	84,402	74,786	10,016	5,577	15,451	0	0	0	P/L
ORIG - DEST	1,000	1,000	35	0	10	LRC	2.77	85,434	74,840	10,994	5,627	16,478	0	0	0	P/L
ORIG - DEST	1,100	1,100	35	0	10	LRC	3.00	86,467	74,889	11,979	5,676	17,511	0	0	0	P/L
ORIG - DEST	1,200	1,200	35	0	10	LRC	3.24	87,508	74,938	12,969	5,725	18,552	0	0	0	P/L
ORIG - DEST	1,300	1,300	35	0	10	LRC	3.47	88,555	74,988	13,967	5,775	19,599	0	0	0	P/L
ORIG - DEST	1,400	1,400	35	0	10	LRC	3.70	89,609	75,038	14,971	5,825	20,653	0	0	0	P/L
ORIG - DEST	1,500	1,500	35	0	10	LRC	3.93	90,671	75,089	15,982	5,876	21,715	0	0	0	P/L
ORIG - DEST	1,600	1,600	35	0	10	LRC	4.16	91,739	75,140	17,000	5,927	22,784	0	0	0	P/L
ORIG - DEST	1,700	1,700	35	0	10	LRC	4.39	92,816	75,191	18,025	5,978	23,860	0	0	0	P/L
ORIG - DEST	1,800	1,800	35	0	10	LRC	4.62	93,901	75,243	19,058	6,030	24,945	0	0	0	P/L
ORIG - DEST	1,900	1,900	35	0	10	LRC	4.85	94,988	75,290	20,098	6,082	26,037	0	0	0	P/L
ORIG - DEST	2,000	2,000	35	0	10	LRC	5.08	96,089	75,342	21,146	6,134	27,138	0	0	0	P/L

737-500 payload range summary – Arequipa



Payload (1,000 Lb)



737-500 range capability – Arequipa (AQP)



From AQP – 85% Annual Winds

737-500/CFM56-3C1
113,800-lb TOW *
73 passengers and bags
(70% load factor)

737-500/CFM56-3C1
113,800-lb TOW *
104 passengers and bags

- typical mission performance rules
- 85% annual winds
- ISA + 10°C en route temperature
- 200-nmi alternate
- passenger and baggage weight = 210-lb
- Airways and traffic allowances included
- Performance includes 2% fuel burn markup

* AQP runway 27 - 9,777 ft
8,404-ft elevation
Annual ADM airport temperature = 20.9 C

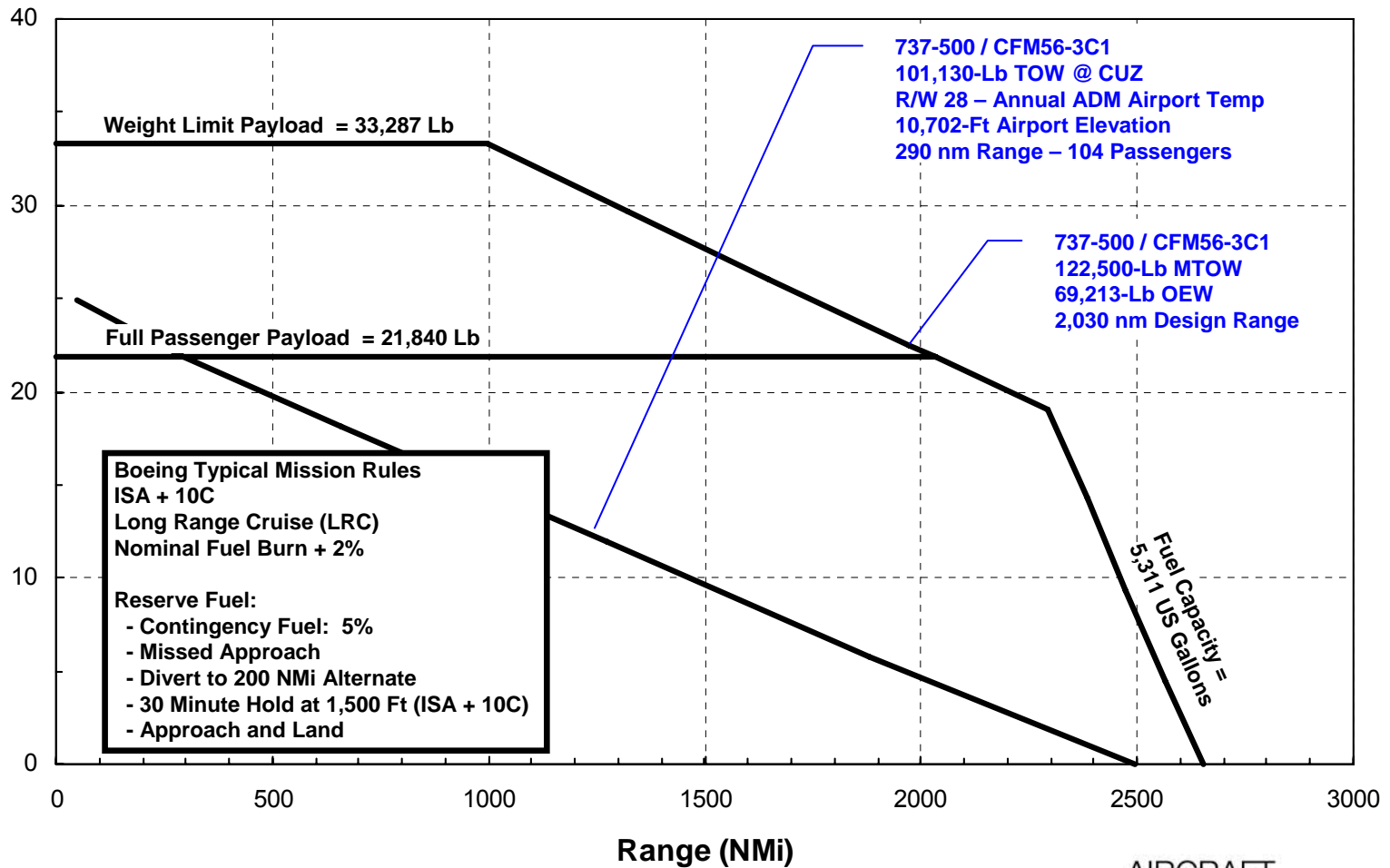


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737-500 payload range summary – Cuzco



Payload (1,000 Lb)



737-500 range capability – Cuzco (CUZ)



From CUZ – 85% Annual Winds

737-500/CFM56-3C1
101,130-lb TOW *
73 passengers and bags
(70% load factor)

737-500/CFM56-3C1
101,130-lb TOW *
104 passengers and bags

- typical mission performance rules
- 85% annual winds
- ISA + 10°C en route temperature
- 200-nmi alternate
- passenger and baggage weight = 210-lb
- Airways and traffic allowances included
- Performance includes 2% fuel burn markup

* CUZ runway 28 - 11,155 ft
10,702-ft elevation
Annual ADM airport temperature = 19.5 C

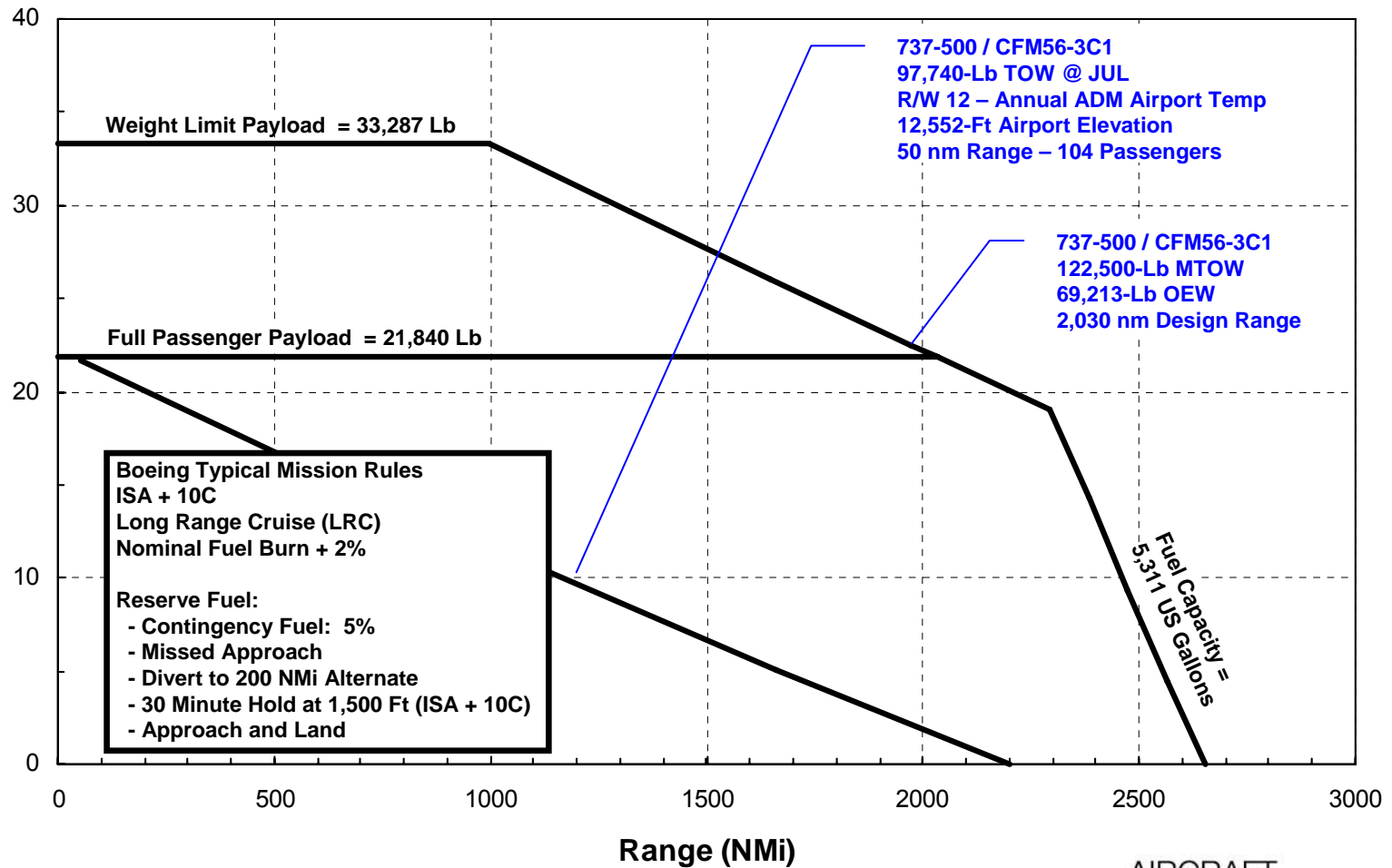


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737-500 payload range summary – Juliaca



Payload (1,000 Lb)



737-500 range capability – Juliaca (JUL)



From JUL – 85% Annual Winds

737-500/CFM56-3C1
97,740-lb TOW *
73 passengers and bags
(70% load factor)

737-500/CFM56-3C1
97,740-lb TOW *
104 passengers and bags

- typical mission performance rules
- 85% annual winds
- ISA + 10°C en route temperature
- 200-nmi alternate
- passenger and baggage weight = 210-lb
- Airways and traffic allowances included
- Performance includes 2% fuel burn markup

* JUL runway 12 - 13,780 ft
12,552-ft elevation
Annual ADM airport temperature = 17.1 C





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737-500 / CFM56-3C1

Appendix I: Performance Ground Rules

October 2008

Performance criteria



Performance results are based on nominal performance levels from current Boeing Airplane Performance Documents and study assumptions as presented in the performance ground rules summary of this study appendix. The data presented herein is not to be used for actual dispatch planning.

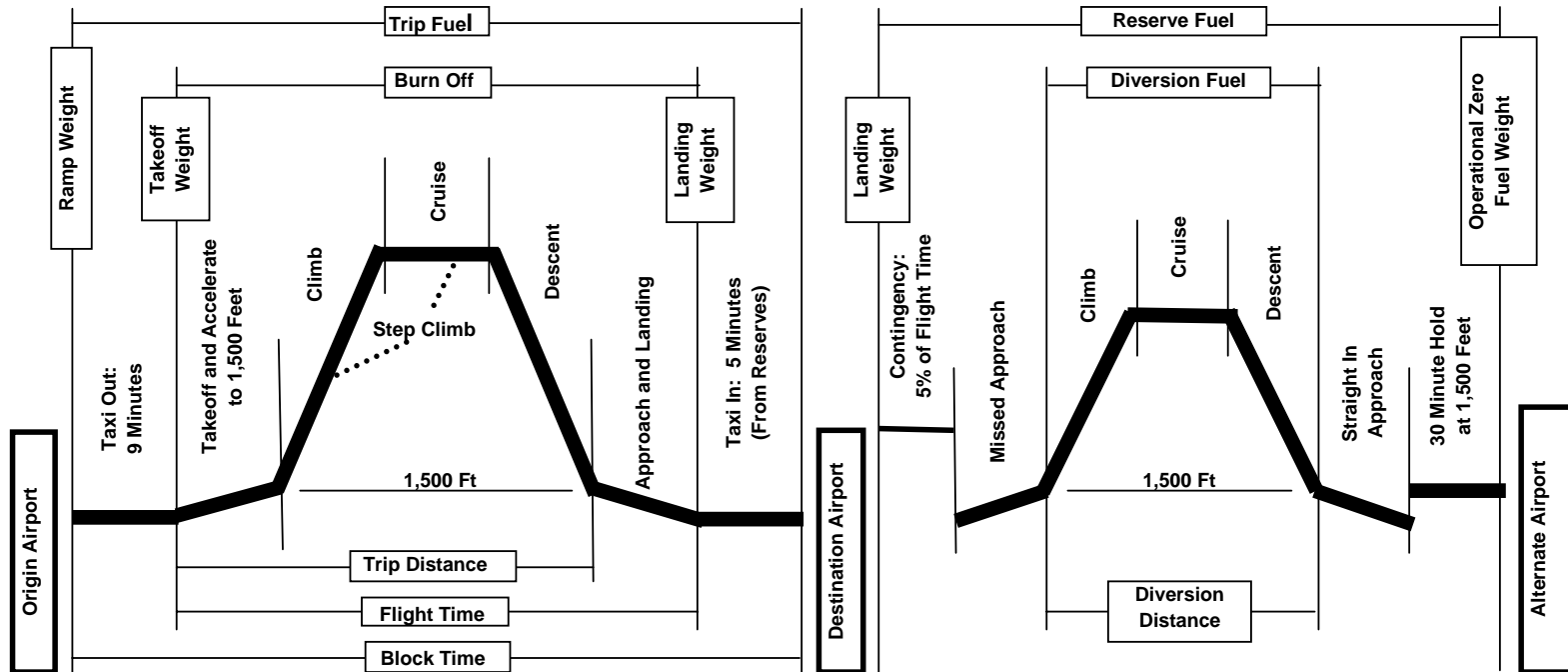
For study purposes, a 2 percent fuel burn conservatism has been added to fuel consumption for all study aircraft to represent aircraft in-service degradation.

Mission flight profile summary

Boeing typical rules



Cruise Conditions: Enroute Winds = 85% Annual
 Enroute Temperature = 85% Annual
 Long Range Cruise (LRC)



Operating allowances and rules



ALLOWANCES

Engine Start and Taxi Out

Maneuver Time

9 Minutes

Taxi in

5 Minutes

Taxi in fuel is taken out of reserves. It is, however, included in block fuel.

RULES

Takeoff and Accelerate

The maximum allowable takeoff weights are set by the maximum structural weight or the FAA requirements for field length, second segment climb, tire speed, and brake energy limitations. All airports have been analyzed with respect to field length, elevation and airport ambient temperatures at annual Average Daily Maximum (ADM).

Runway clearway and stopway, slope and obstacles, if applicable, were taken into consideration in the analysis.

Data for all of the study airports are referenced from the latest ICAO and / or Jeppesen data bases.

Takeoff and accelerate begins at brake release and ends at 1,500 feet above the origin airport elevation.

Climb

Climb begins at 1,500 feet above the origin airport elevation and ends at initial cruise altitude. Seventy (70) percent of the en route cruise wind is applied during the climb procedure. Minimum fuel burn climb speed schedule is used.

Operating allowances and rules (continued)



Cruise	<p>Long Range Cruise (LRC) procedures are used for both the en route and flight to alternate profile.</p> <p>Cruise altitudes are based on a constant flight level that yields the maximum payload possible with minimum fuel burned (with appropriate step climb if required). All payload range sector distances assume westbound traffic altitudes.</p>
Descent	<p>Descent begins at cruise altitude and ends at 1,500 feet above destination airport elevation with credit taken for descent distance. Seventy (70) percent of the en route cruise wind is applied during descent. Minimum fuel burn descent speed schedule is used.</p>
Approach and Landing	<p>Decelerate, perform straight in approach and land.</p>
Atmospheric Conditions	<p>En route temperatures are assumed to be ISA + 10 degrees celsius for both the primary and flight to alternate profile.</p>
Winds	<p>For the range capability circle maps, the en route winds are based on 85 percent annual reliability for the primary flight profile.</p>
Distances	<p>For all payload range and fuel burn matrix calculations, the distance from the destination airport to the appropriate alternate airport is assumed to be 200 nautical miles.</p>
Fuel Conservatism	<p>Fuel burn is increased by 2.0 percent over nominal levels to reflect aircraft in-service fuel burn degradation.</p>

Operating allowances and rules (continued)



Reserve Fuel

Regional operation:

- Contingency fuel = 5% flight time
- Missed approach
- Flight to the designated alternate at 200 nautical miles
- Hold for 30 minutes at 1,500 ft at ISA + 10 C
- Approach and landing at the alternate

Weights and Volumes

The following passenger and baggage weight is assumed:

Passenger weight = 165 pounds

Baggage weight = 45 pounds

Baggage and cargo density = 10 pounds per cubic foot

Fuel

Fuel density is assumed to be 6.5 pounds per US Gallon.

Allowable airport takeoff weight summary

737-500 – CFM56-3C1 engines



- A/C OFF
- FAA Regulations - DRY Runway
- Takeoff Reference C.G.: Forward
- Optimum Takeoff Performance
- Surface Temperature Reliability: Annual ADM

Airport ¹ (CODE)	Runway	Pressure Altitude (ft)	Field Length (ft)	Slope (%)	Clearway (ft)	Stopway (ft)	Obstacles ²		Surface Temperature Season	Temperature (°C)	Takeoff Weight ³ (lb)
							Height (ft)	Distance (ft)			
Arequipa (AQP)	27	8,404	9,777	-1.37	197	0			Annual	20.9 †	113,800
Cuzco (CUZ)	28	10,702	11,155	1.40					Annual	19.5 †	101,130
Juliaca (JUL)	12	12,552	13,780	0.00	0	0			Annual	17.1 †	97,740

Notes:

1. BAIRS airport definitions
 2. Height referenced to the liftoff end of the runway. Distance referenced to the liftoff end of the runway
 3. Takeoff weight limit codes: s = Maximum structural takeoff weight, f = Field length, t = Tire speed, o# = Obstacle number #
- † Database
‡ Fixed
Δ ISA + Delta temperature

Route analysis legend



APOLLO AVIATION GROUP 737-500 - 122,500-LB MTOW - PAYLOAD RANGE CFM56-3C1 ENGINES - 104 PASSENGERS NOMINAL PERFORMANCE + 2% MARKUP		Max Taxi Wt: 123,000 lb Max TO Wt: 122,500 lb Max Land Wt: 110,000 lb Max Zero Fuel Wt: 102,500 lb Op Empty Wt: 69,213 lb Fuel Capacity: 5,311 gallons Fuel Wt: 34,522 lb @ 6.50 lbs/gal	Payloads Structural Pld: 33,287 lb Study Pld: 33,287 lb Passenger Seats: 104 @ 210 lb ea Psgr & Bags Pld: 21,840 lb Rev Cargo: 11,447 lb
Aircraft: 737-500 Engine: CFM56-3C1(20K)	Interior: 104 Passengers		
<small>737-500 PayloadRange-BaseCase / 737-500 / CFM56-3-B1-20 / D6-38199-REVb / 9/30/08 15:13:40</small>			

Route	Dist (nm)	ESAD (nm)	Cruise Altitude (1000 ft)	0 Wind (knots)	Cruise Delta Temp (°C)	Cruise Proc	Block Time (hrs)	Takeoff Weight (lb)	Landing Weight (lb)	Block Fuel (lb)	Reserve Fuel (lb)	Total Fuel (lb)	Psg	Cargo (lb)	Total Payload (lb)	Limit
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)

- A** Analysis Airframe and Engine Combination
- B** Airplane Configuration Summary / Definition
 - Design Weights
 - Fuel Weight with Assumed Fuel Density
- C** Airplane Payload Summary
 - Structural Payload
 - Study Payload - Cargo

Route Information	
(1)	Origin - Destination
(2)	Distance Between Origin and Destination
(3)	Equivalent Still Air Distance - With En Route Winds in (5)
(4)	Cruise Altitude - Fixed or Step Climb
(5)	Winds at Cruise Altitude or Altitudes
(6)	En Route Temperature at Cruise Altitude - STD + Increment
(7)	Vmax, Long Range Cruise (LRC) or Fixed Mach Number

Airplane Performance Summary	
(8)	Block Time
(9)	Ramp Weight Less Engine Start and Taxi Out Fuel
(10)	Airplane Weight at Touchdown
(11)	Engine Start to Touchdown Fuel
(12)	Reserve Fuel at Shutdown or Touchdown
(13)	Block Fuel Plus Reserve Fuel Unless Taxi In Fuel is Part of Reserves

Airplane Payload Summary	
(14)	Number of Passengers Carried on Route
(15)	Amount of Cargo that Can be Carried
(16)	Sum of Passenger (14) and Cargo (15)
(17)	See Mission Limit Codes Summary Matrix

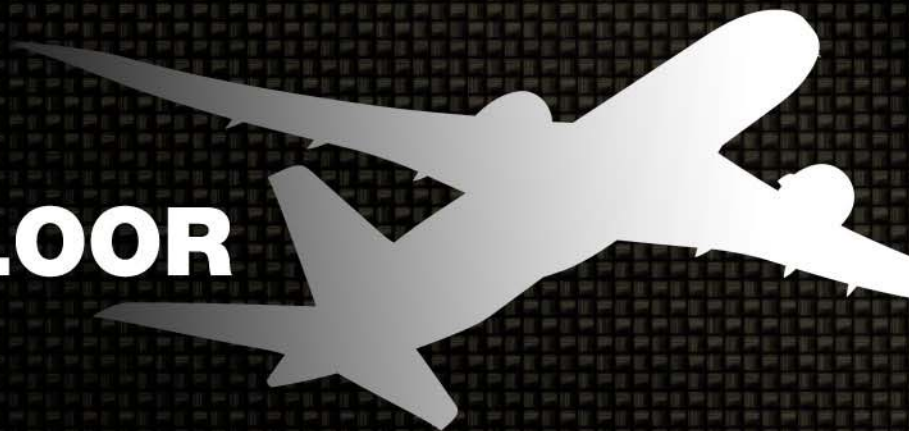
Mission limit codes



Airport Limits		Route Payload Limits	
AIRPORT	- User Specified Weight	AFUL	- Avail Fuel Weight
BE	- Brake Energy Field Length	ALND	- Alternate Airport Landing Weight
BE+CL	- Brake Energy + Improved Climb	ATOW	- Airport Takeoff Weight
CLIMB	- Climb	BUFF	- Buffet
FL	- Field Length	CEIL	- Ceiling
FL+CL	- Field Length + Improved Climb	DLND	- Destination Max Landing Weight
MAX CLB	- Max Improved Climb	FUEL	- Fuel Capacity
MTOW	- Max Takeoff Weight	MLND	- Max Landing Weight
NO-CALC	- Limits Not Calculated	MTOW	- Max Takeoff Weight
TS	- Tire Speed	MZFW	- Max Zero Fuel Weight
TS+CL	- Tire Speed + Improved Climb	NO-CALC	- Limits Not Calculated
VMCG	- Min Control Speed Ground	P/L	- Payload
VMCG+CL	- VMCG + Improved Climb	TAXI	- Taxi Weight
		TOW	- User Specified Takeoff Weight



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