Cessna Citation II Bravo

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http://bravo.cessna.com/gallery.chtml

History

- Citation II intial design was announced in 1976
- The first deliveries were made in 1978
- Small business jet transport
- Design objectives
  - Low first costs
  - Economy of operation
  - Safety
  - Good handling characteristics

History

- The aircraft has wide operational flexibility
- Designed to take off and land from most fields used by light and medium twin-engine propeller-driven aircraft, and from unpaved runways
- Citation II is somewhat larger and heavier than the Citation I and has a longer range capability
- The Citation II was upgraded in 1984 with the improved Citation S-550 (S/II)
- Improvements were mainly aerodynamic
  - New wing designed using supercritical technology
  - JT15D4B turbofans
- Citation II Bravo was introduced in 1994
  - Certified in 1996
  - Improvements include upgraded avionics, trailing link landing gear, more speed, range and payload
  - Deliveries began in February 1997

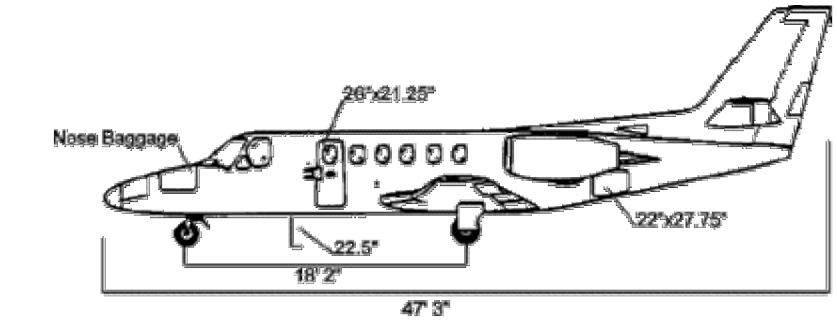
Basics

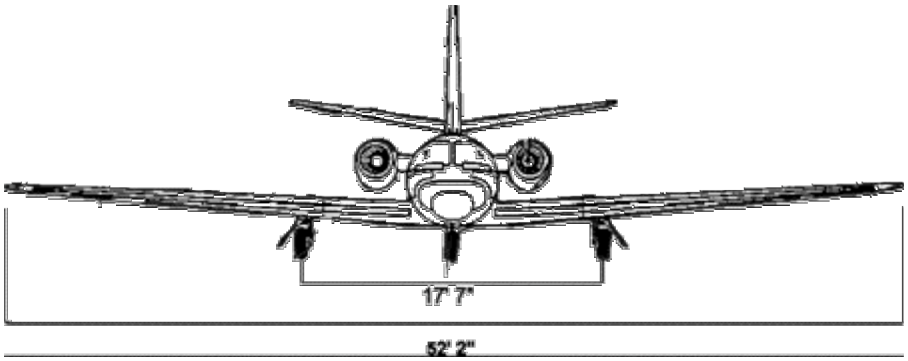
- The Citation II has an unswept, tapered wing
- Aspect ratio = 7.8
- Airfoil-section thickness ratios that vary from 14 percent at the root to 12 percent at the tip.
- Horizontal tail
  - Located near root of vertical fin
  - Incorporates a small amount of dihedral to reduce immersion in the jet exhaust
- Vertical tail
  - Relatively large dorsal fin
  - Small ventral fin
  - Improves directional stability
- Power supplied by two Pratt & Whitney PW503A turbofan engines
  - 2885 pounds thrust each
  - Bypass ratio of 3.3

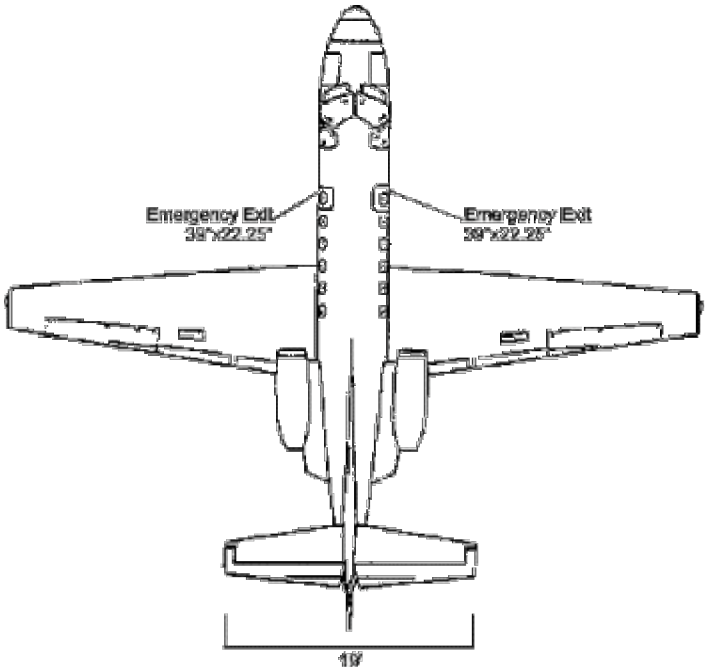
High Lift & Control

- Single-slotted trailing-edge flap
- No leading-edge devices
- Spoilers located on the upper wing surface ahead of the flap
  - Used as air brakes
  - Not part of the lateral control system, which utilizes only ailerons.
- Longitudinal control is by elevators
- Trim obtained by an electrically operated trim tab on the elevator
- All controls are manually operated

3 View Drawing







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Geometry

b_{wing} (ft)	52.2
b_{tail} (ft)	19
L (ft)	47.2
S (ft^2)	323
S_{wet} (ft^2)	1910
S_{tail} (ft^2)	67.07
AR	7.8
sweep (deg)	0
wing t/c_{root}	0.14
wing t/c_{tip}	0.12
wing taper ratio	0.316
tail taper ratio	0.445
tail scrape angle (deg)	12.8
wing dihedral (deg)	4.5
tail dihedral (deg)	10

Other Dimensions

Fuselage Height:	4.8 ft
Tail Height:	14 ft 9.6 in
Cabin Doors:	39 in x 21.25 in
Baggage Doors (rear):	22 in x 27 in
Cabin Length:	20.9 ft
Cabin Width:	4.9 ft
Useable Volume:	491 cu ft
Nose Baggage:	28 cu ft
Cabin Baggage:	947 cu ft

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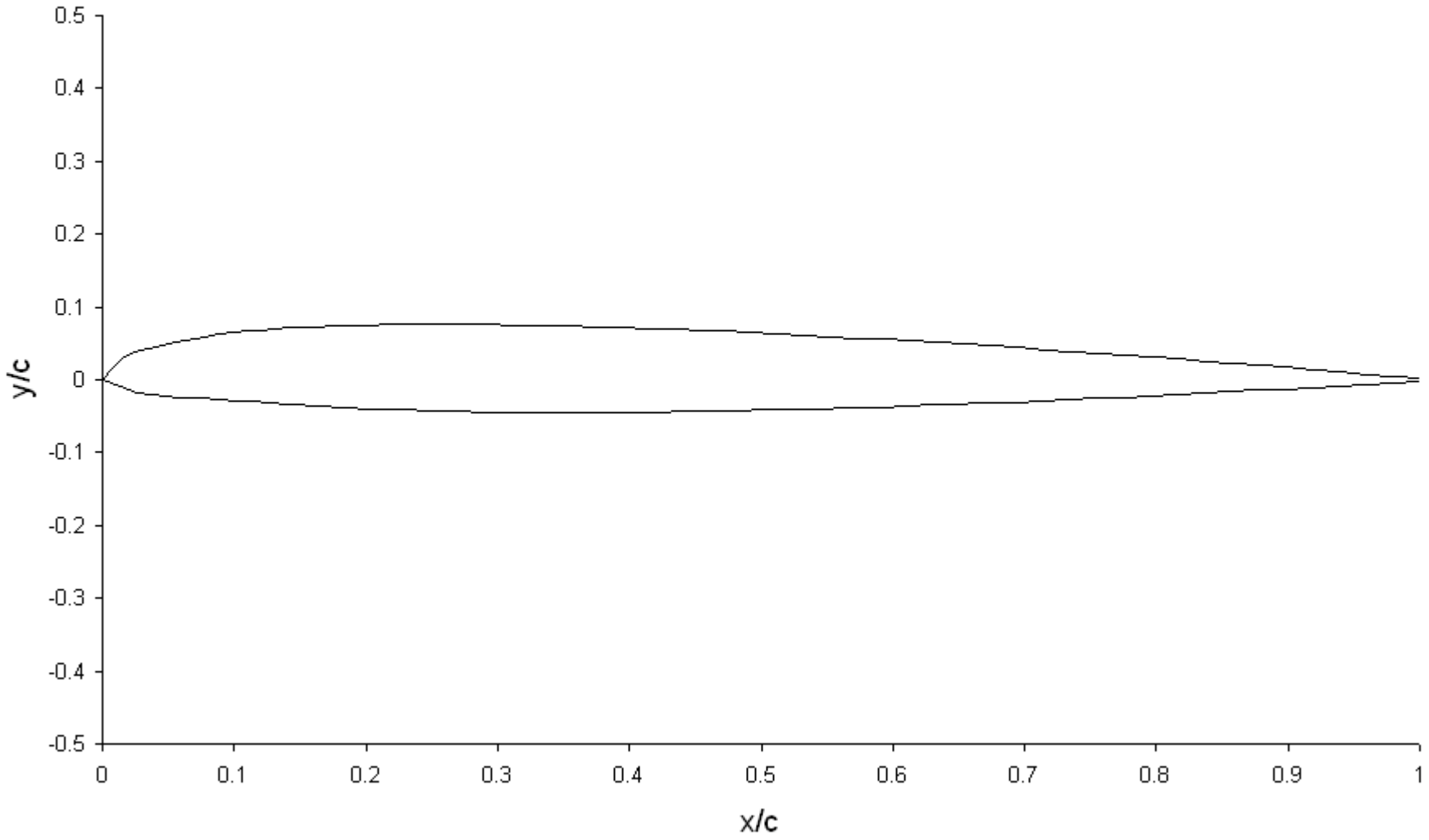
Performance

W_g (lbs)	14800
W_L (lbs)	1992
W_e (lbs)	7800
W_{fuel} (lbs)	5008
T/W_g	0.39
W_g/S	45.8
Ceiling	43,000 feet
Rate of Climb	2500 ft/min at sea level

Aerodynamics

K	0.0453
C_L cruise	0.4192
$(L/D)_{max}$	26.31
C_L max (TO)	1.5359
$C_{L\ alpha}$ (per deg)	0.1785
V_{stall} (ft/s)	158.4
Neutral Point	4.33 ft back from LE
Center of Gravity	17.75 ft back from Nose
Load Split	Wing carries 89.3% of lift
	Tail carries 10.7% of lift

NACA 23012



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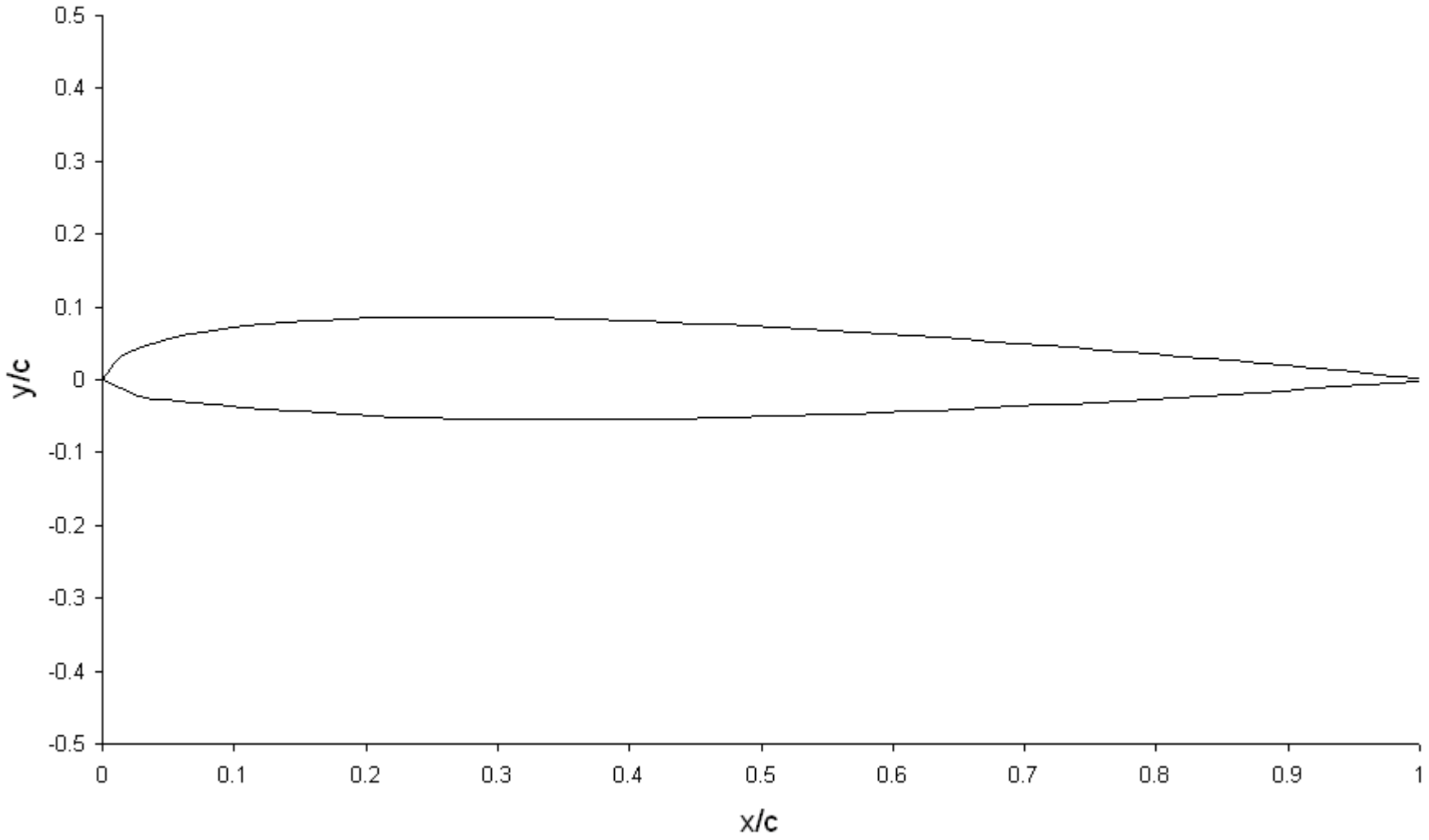
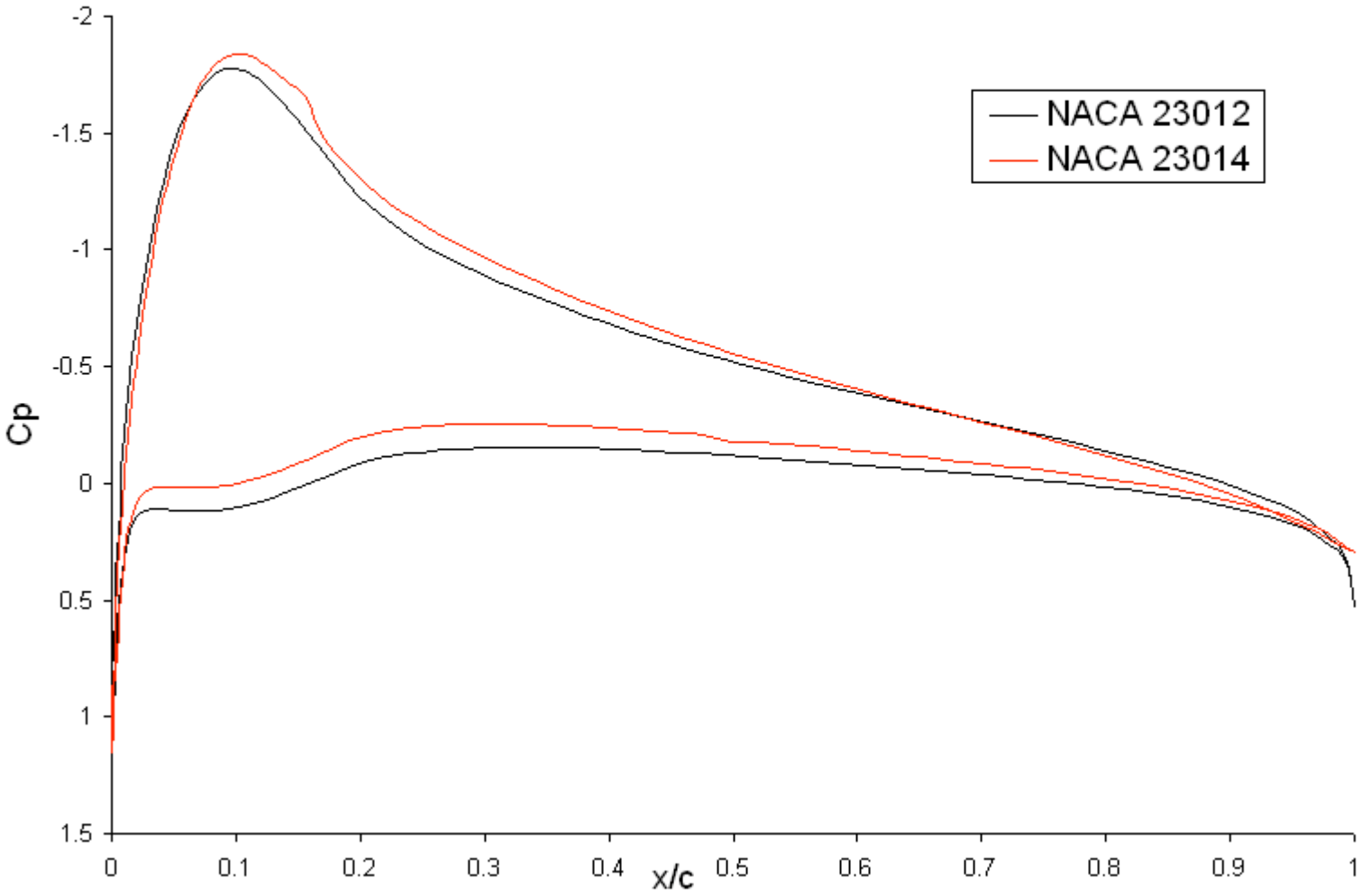
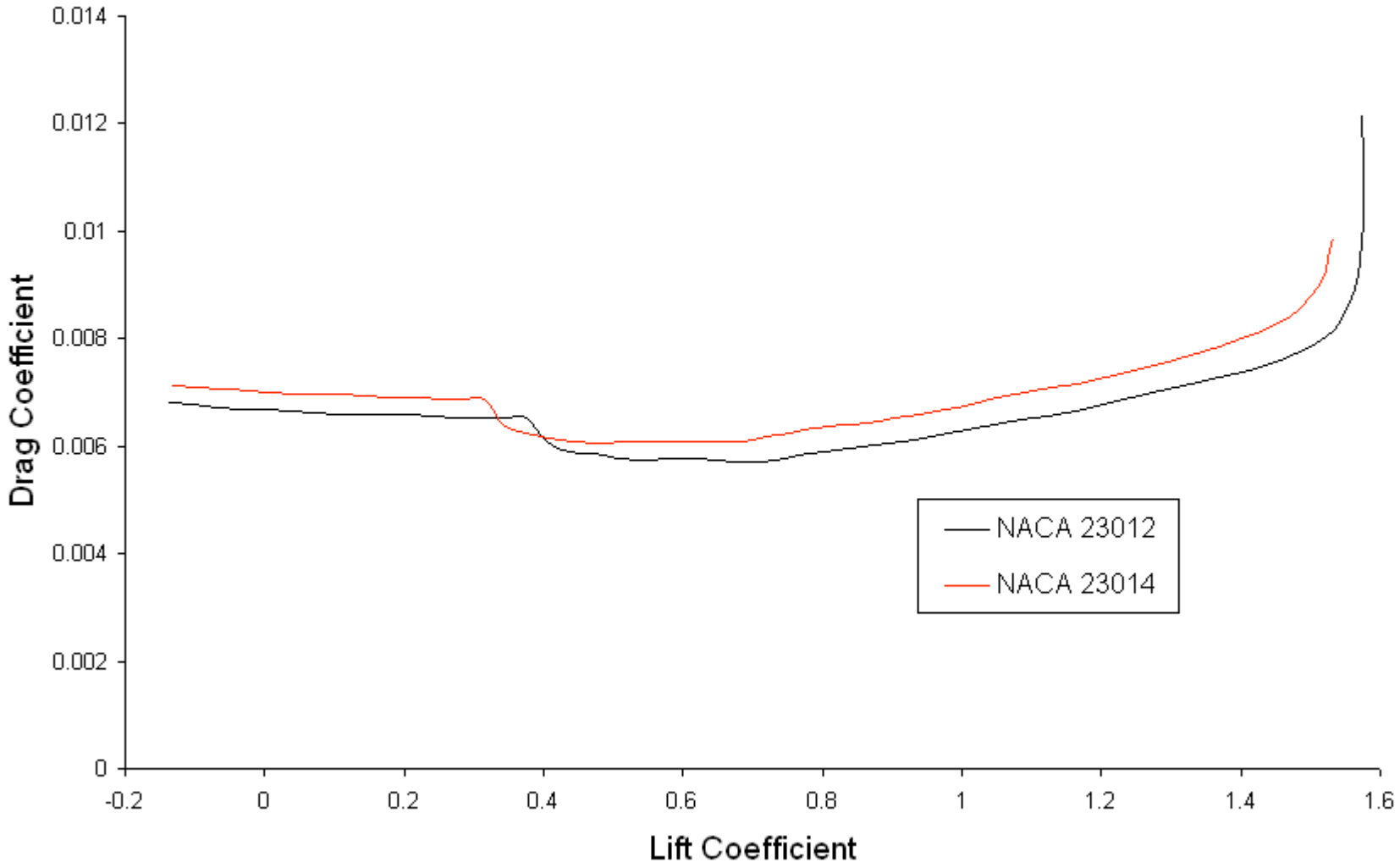


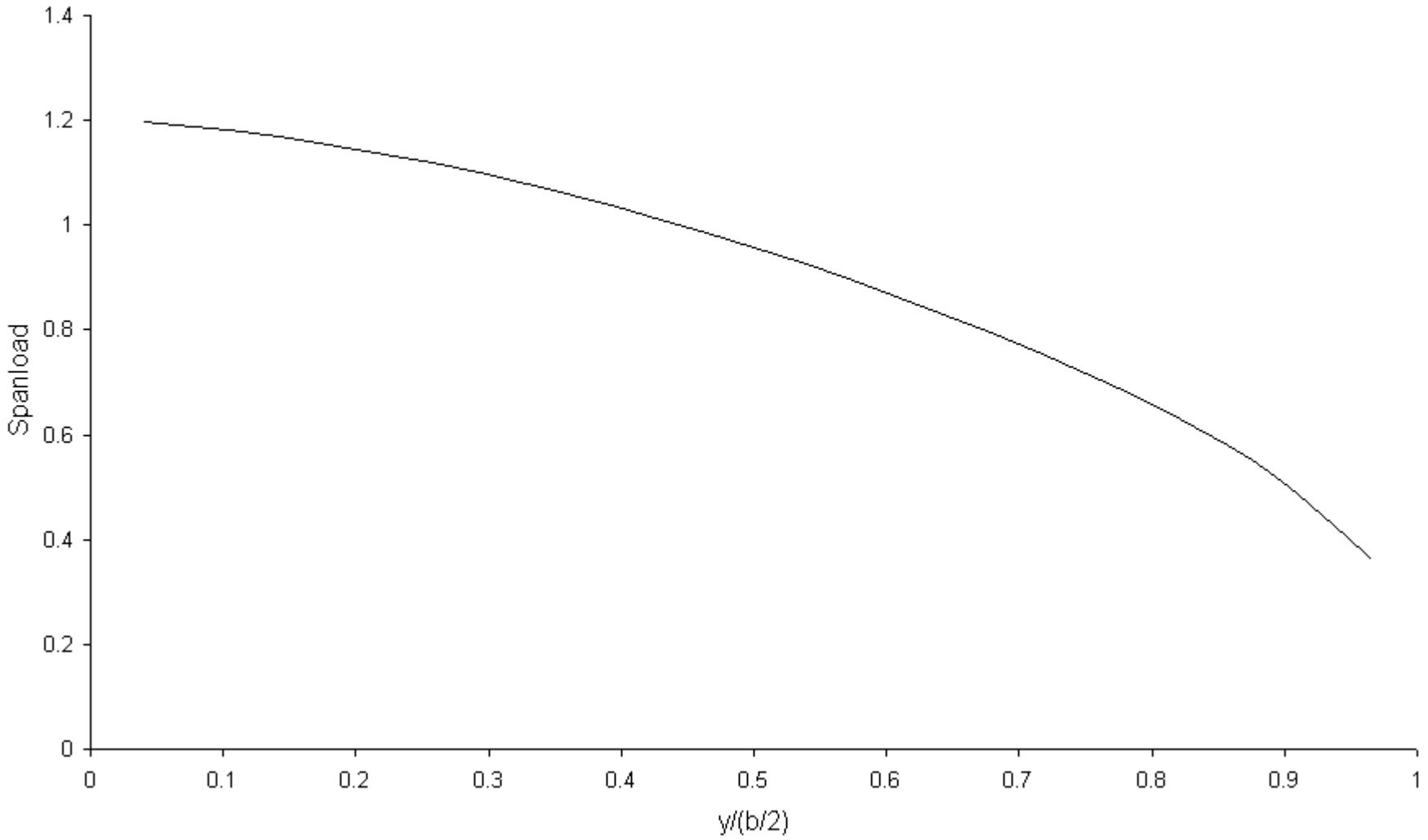
Cp Distribution

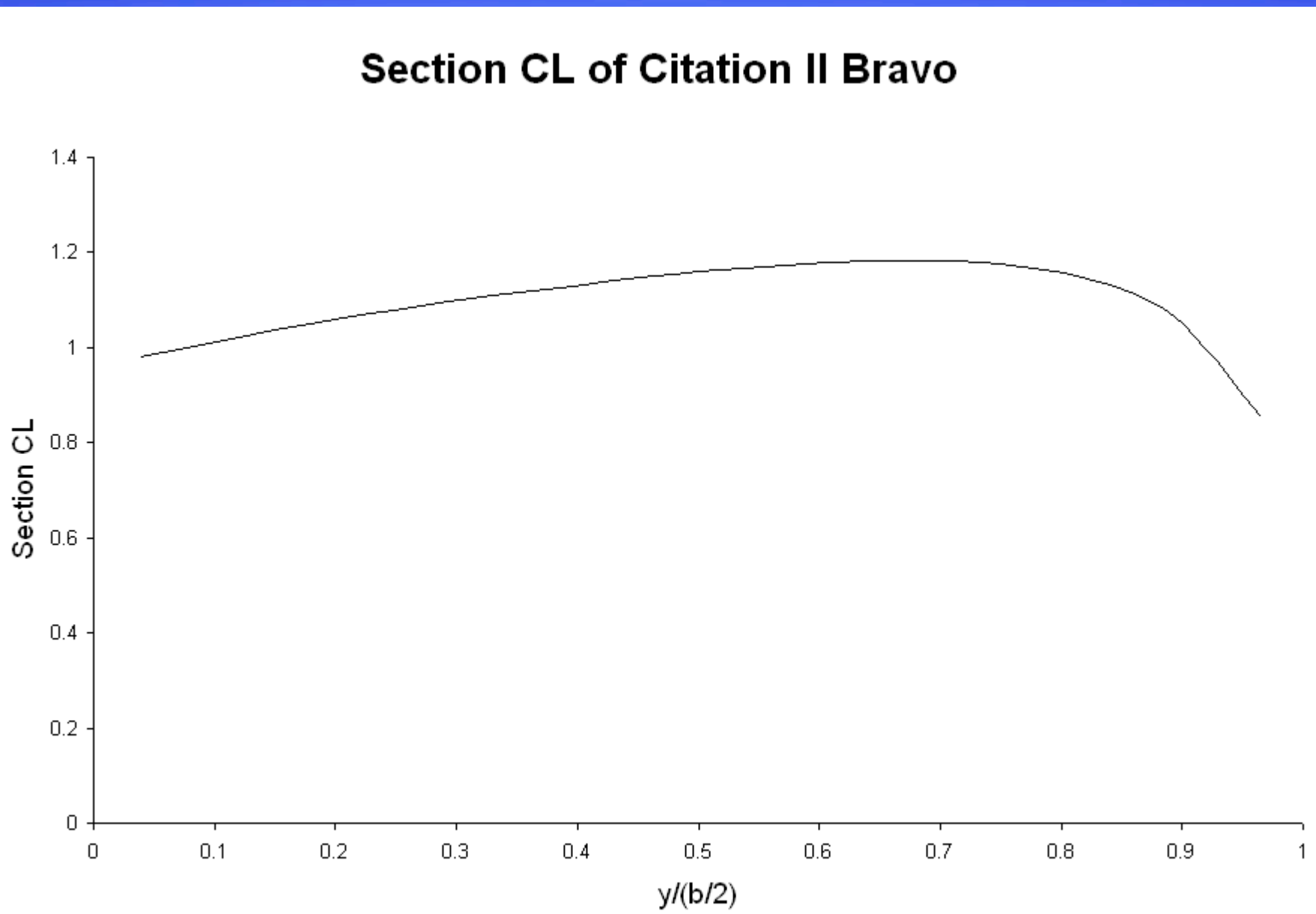


Drag Polar


0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Drag Coefficient
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
Lift Coefficient
NACA 23012
NACA 23014

Spanload of Citation II Bravo




Section CL of Citation II Bravo
Section CL
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
y/(b/2)

Climb Performance

Time (min)	TAKEOFF WEIGHT (lbs)		
Altitude (ft)	11,000	13,000	14,800
25,000	7	8	10
35,000	11	14	17
39,000	14	18	22
41,000	16	20	26
43,000	18	23	32
Distance (nm)	**TAKEOFF WEIGHT (lbs)**		
Altitude (ft)	**11,000**	**13,000**	**14,800**
25,000	23	28	34
35,000	43	54	66
39,000	55	71	90
41,000	63	84	109
43,000	74	100	141
Fuel (lbs)	**TAKEOFF WEIGHT (lbs)**		
Altitude (ft)	**11,000**	**13,000**	**14,800**
25,000	211	258	305
35,000	304	378	456
39,000	347	438	539
41,000	372	475	597
43,000	400	520	681

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Cruise Performance

Weight (lbs)	11,000	13,000	14,500
Altitude (ft)	Speed (Mach) / fuel flow (lbs/hr)		
33,000	0.696 / 1,200	0.689 / 1,197	0.681 / 1,195
35,000	0.699 / 1,123	0.690 / 1,134	0.677 / 1,124
37,000	0.695 / 1,040	0.678 / 1,029	0.664 / 1,023
39,000	0.685 / 934	0.664 / 926	0.650 / 917
41,000	0.673 / 844	0.652 / 835	0.636 / 830
43,000	0.657 / 750	0.636 / 751	0.624 / 752

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Takeoff & Landing Performance

Takeoff Distance

(15° Flaps) Required Field Length per FAR 25

WEIGHT (lbs)	SEA LEVEL 59°F	5000 ft 41°F	5000 ft 77°F
14,800	3,600	4,350	5,520
14,000	3,310	3,900	4,880
13,000	3,000	3,490	4,180
12,000	2,720	3,150	3,630
11,000	2,610	2,850	3,210

Landing Distance

SL STD, Distance From 50 ft Above the Runway

WEIGHT (lbs)	DISTANCE (ft)
13,500	3,180
13,000	2,970
12,000	2,620
11,000	2,340
10,000	2,140

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