



Introduction to Runway Length Calculations Aircraft with Takeoff Weights less than 60,000 lbs.

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Runway Length Calculations are Critical to Safe Airport Operations

- Provide safety to airport operations
- Inadequate runway length limits the payload carried on certain trips (or routes)
- A critical procedure in airport design or airport evaluation analysis



Falcon 7X
Departs the old 4,500
ft. runway at Virginia
Tech Montgomery
County Executive
airport (A. Trani)



Runway Length Guidelines Used in Airport Design (FAA 150/5325-4b)

- Airport design guidelines are contained in the Federal Aviation Administration (FAA) advisory circulate 150/5325-4b
- Four chapters provide guidance to estimate runway length for all types of aircraft (small, medium, and large)



U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

Subject: RUNWAY LENGTH
REQUIREMENTS FOR AIRPORT DESIGN

Date: 7/1/2005
Initiated by: AAS-100

AC No: 150/5325-4B
Change:

1. PURPOSE. This Advisory Circular (AC) provides guidelines for airport designers and planners to determine recommended runway lengths for new runways or extensions to existing runways.

Get the document at: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_150_5325-4B.pdf



Runway Length Calculation Methods for Aircraft with Max. Takeoff Weight < 60,000 lbs

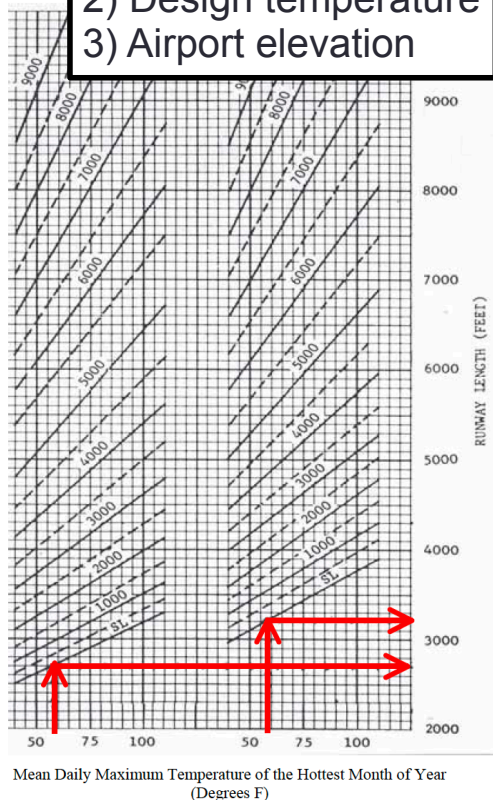
- FAA Advisory Circular 150/5325-4b
- Use of nomographs to predict runway length
- Chapter 2 has nomographs for Small aircraft ($\leq 12,500$ lbs.)
- Chapter 3 has nomographs for aircraft ($> 12,500$ lbs. but less than 60,000 lbs.)
- Both chapters will change at the end of the year when the new FAA Advisory Circular is replaced by a new version (5325-1c)

The nomographs in Chapters 2 and 3 will be replaced using the **Small Aircraft Runway Length Analysis Tool (SARLAT)** developed for the FAA by the Air Transportation Systems Laboratory at Virginia Tech.

FAA AC 150/5325-4B Current Method to Estimate Runway Length

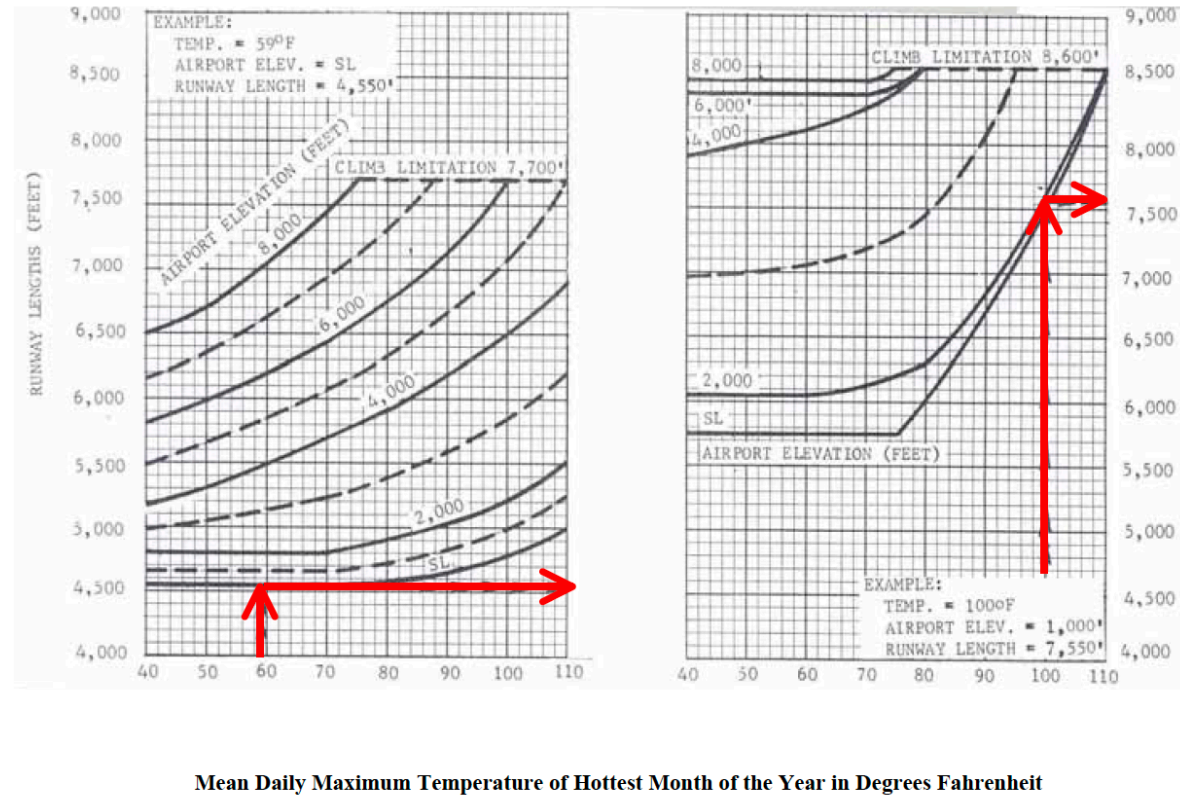
Inputs:

- 1) Fleet
- 2) Design temperature
- 3) Airport elevation



Aircraft with Max. Takeoff Weights
Up to 12,500 lbs.
(Chapter 2)

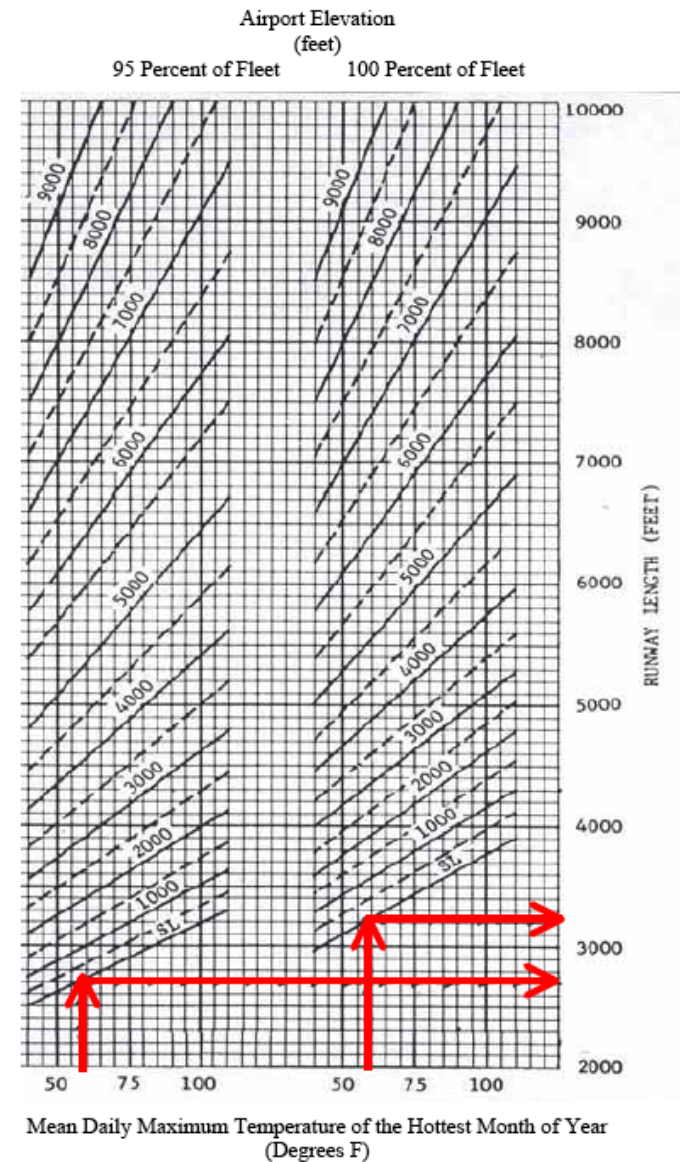
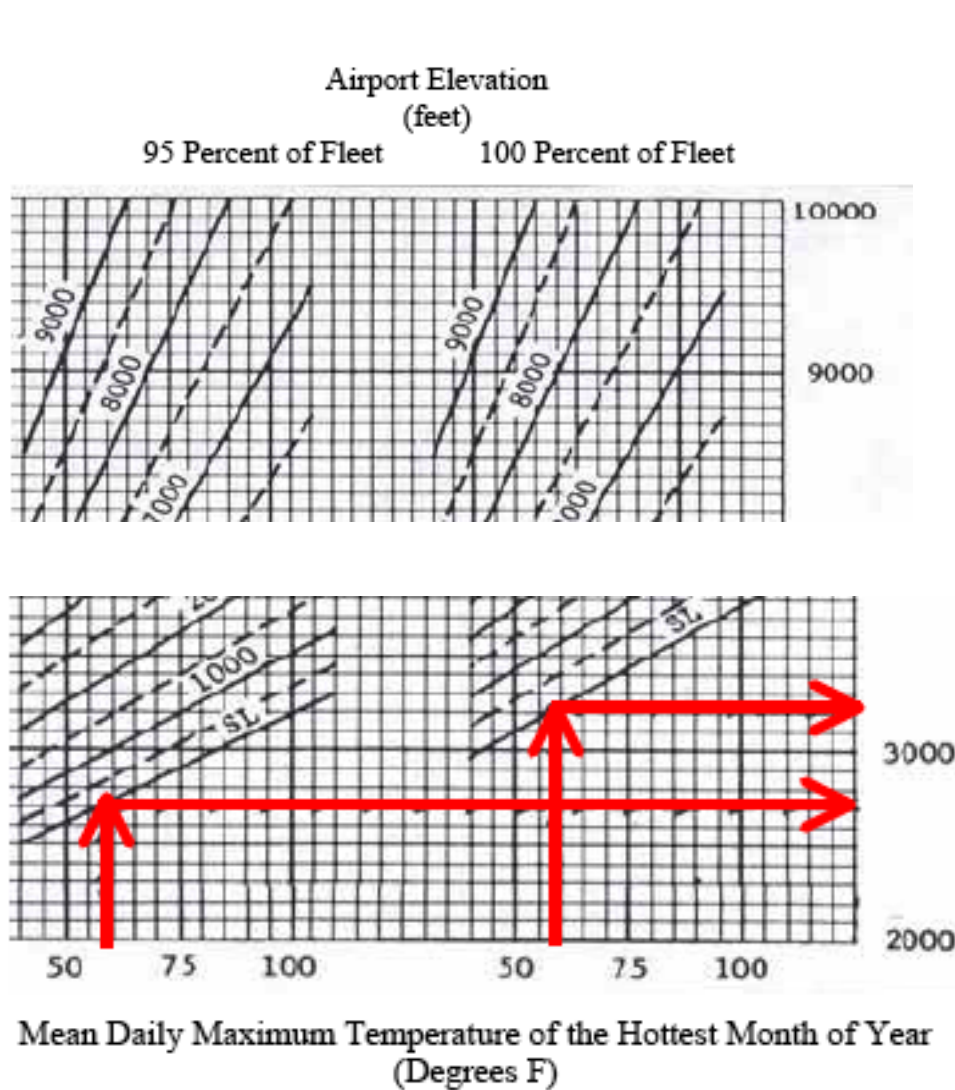
Figure 3-1. 75 Percent of Fleet at 60 or 90 Percent Useful Load



Mean Daily Maximum Temperature of Hottest Month of the Year in Degrees Fahrenheit
75 percent of feet at 60 percent useful load 75 percent of feet at 90 percent useful load

Aircraft with Max. Takeoff Weights
12,501 to 60,000 lbs.
(Chapter 3)

Figure 2-1 in AC 150/5325-4b





Current Method (FAA 150/5325-4b)

- For Aircraft with maximum takeoff weights less than 60,000 consult **Chapters 2 and 3 of the FAA AC 150/5325-4B**
- The procedures in the advisory circular also assume:
 - No wind conditions
 - Zero runway gradient
 - Dry runway conditions
 - Data is corrected to account for humidity



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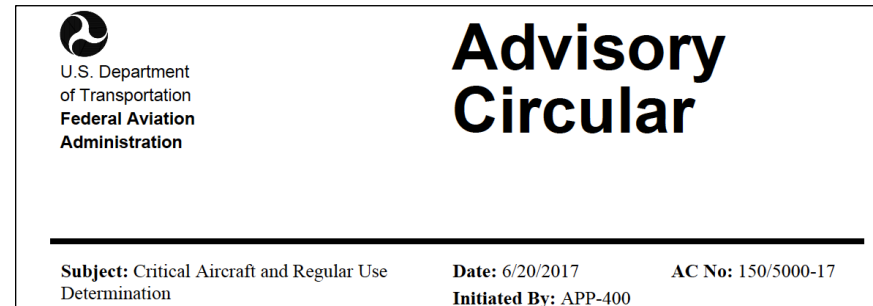
Initiated by: AAS-100

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Critical Design Aircraft (FAA AC 150/5000-17)

- Both itinerant and local operations (excluding touch-and-go operations) count towards regular use
 - Itinerant - trips starts at the airport and ends elsewhere
 - Local - trip starts and ends at the airport
- Criteria to be considered
 - Critical Aircraft for runway length (i.e., longest runway length required)
 - Critical Aircraft Runway Design Code (RDC) – the combination of the most demanding AAC and ADG
 - Critical Aircraft or grouping of aircraft for runway length
 - Critical Aircraft or grouping of aircraft in the most demanding Taxiway Design Group (TDG)



The critical aircraft should operate 250 landings and 250 takeoffs (or 500 itinerant operations) at the airport



Steps in the Runway Length Analysis Procedure (5 steps)

1. Identify the list of potential critical airplanes
2. Identify the weights of the critical aircraft and associated weight class
 - If the aircraft MTOW $< 60,000$ then the method used is based on a “Family Grouping of Airplanes”
 - If the aircraft MTOW $\geq 60,000$ then the method used is based on an “Individual analysis”
 - Regional Jets use the second method even if their weight is below 60,000 lb.
3. Use Table 1-1 and the critical aircraft in step 2 to decide on the recommended method for runway length required

Steps in the Runway Length Procedure (5 steps)

Table 1-1. Airplane Weight Categorization for Runway Length Requirements

Airplane Weight Category Maximum Certificated Takeoff Weight (MTOW)			Design Approach	Location of Design Guidelines
12,500 pounds (5,670 kg) or less	Approach Speeds less than 30 knots		Family grouping of small airplanes	Chapter 2; Paragraph 203
	Approach Speeds of at least 30 knots but less than 50 knots		Family grouping of small airplanes	Chapter 2; Paragraph 204
	Approach Speeds of 50 knots or more	With Less than 10 Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-1
		With 10 or more Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-2
Over 12,500 pounds (5,670 kg) but less than 60,000 pounds (27,200 kg)			Family grouping of large airplanes	Chapter 3; Figures 3-1 or 3-2 ¹ and Tables 3-1 or 3-2
60,000 pounds (27,200 kg) or more or Regional Jets ²			Individual large airplane	Chapter 4; Airplane Manufacturer Websites (Appendix 1)

Note¹: When the design airplane's APM shows a longer runway length than what is shown in figure 3-2, use the airplane manufacturer's APM. However, users of an APM are to adhere to the design guidelines found in Chapter 4.

Note²: All regional jets regardless of their MTOW are assigned to the 60,000 pounds (27,200 kg) or more weight category.

Source: FAA 150/5325-4b



Steps in the Runway Length Procedure (5 steps)

4. Select the recommended runway length from various runway lengths generated in step # 3
5. Apply adjustments (if applicable) to the runway length obtained in step # 4 for aircraft with maximum takeoff gross weights between 12,500 lbs and 60,000 lbs
 - Runway gradient
 - Wet pavement conditions



Definition of Primary Runway

- Most airports require only one primary runway
- Primary runways are designed and oriented so that 95% of the time the design crosswind components are not exceeded (more later in the course)
- However, sometimes multiple primary runways are needed for:
 - Capacity reasons
 - To accommodate forecasted growth
 - To mitigate noise impacts
- Design objective for additional primary runways is contained in Table 1-2 of the FAA AC 150/5325-4b

Table 1-2 in FAA AC 150/5325-4b

Table 1-2. Runway Length for Additional Primary Runways

Runway Service Type, User	Runway Length for Additional Primary Runway Equals
Capacity Justification, Noise Mitigation, Regional Jet Service	100 % of the primary runway
Separating Airplane Classes - Commuter, Turboprop, General Aviation, Air Taxis	Recommended runway length for the less demanding airplane design group or individual design airplane

Table 1-3 in FAA AC 150/5325-4b

Table 1-3. Runway Length for Crosswind Runway

Runway Service	Runway Length for Crosswind Runway Equals
Scheduled¹ Such as Commercial Service Airports	100 % of primary runway length when built for the same individual design airplane or airplane design group that uses the primary runway
	100% of the recommended runway length determined for the lower crosswind capable airplanes using the primary runway
Non-Scheduled² Such as General Aviation Airports	100% of the recommended runway length determined for the lower crosswind capable airplanes using the primary runway

Note¹: Transport service operated over routes pursuant to published flight schedules that are openly advertised with dates or times (or both) or otherwise made readily available to the general public or pursuant to mail contracts with the U.S. Postal Service (Bureau of Transportation Statistics, Department of Transportation (DOT)).

Note²: Revenue flights, such as charter flights that are not operated in regular scheduled service, and all non-revenue flights incident to such flights (Bureau of Transportation Statistics, DOT). For Federally funded programs, such as AIP, there must be at least 500 annual itinerant operations and 100% of the class.

Runway Length Based on Declared Distance Concept

- New runways are expected to be designed according to the principles of Tables 1-1 and 1-2 in the AC 150/5325-4b
- **Existing runways sometimes** do not meet all new safety criteria
- The **Declared Distance Concept** provides a rational procedure to define the operational features of such runways
- We will discuss this procedure later in this course



Runway Length for Small Aircraft with Maximum Takeoff Weight < 12,500 lb (5,670 kg)

- Inputs to the procedure:
- Critical aircraft
- Approach speed (30% above the stalling speed)
- Number of passenger seats
- Airport elevation above mean sea level
- Mean daily maximum temperature of the hottest month of the year
- Use Figures 2-1 and 2-2 in AC 150/5325-4b
- No adjustment for runway gradient or wet pavement (e.g., landing performance)

The method for aircraft with Maximum Takeoff Weight < 12,500 lbs in the FAA AC 150/5325-4b will be replaced with SARLAT

Small Airplanes with Approach Speeds < 30 knots

- This group includes ultralight aircraft
- **Recommended runway 300 feet (92 meters) at mean sea level conditions**
- Increase runway by 30 feet for every 1000 feet in airfield elevation ($0.03 \times$ airfield elevation)
- In the U.S. ultralights are regulated by FAR Part 103
- Web links:
- FAR 103 (<https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-103>)



Small Airplanes with Approach Speeds > 30 knots and < 50 knots

- This group includes **Light Sport Aircraft (LSA)**
- **FAA recommends an 800-foot (244 meters) runway at mean sea level conditions**
- Increase runway by 80 feet for every 1000 feet in airfield elevation ($0.08 \times$ airfield elevation)
- Web links:
- FAA LSA: https://www.faa.gov/aircraft/gen_av/light_sport



Light Sport Aircraft (LSA)

- Maximum takeoff gross weight : 1,320 lbs (600 kilograms)
- 1,430 lbs if LSA is a seaplane
- Two seats
- 120 knots maximum cruise speed
- Maximum stall speed : 45 knots
- One engine
- Fixed pitch propeller
- Fixed landing gear



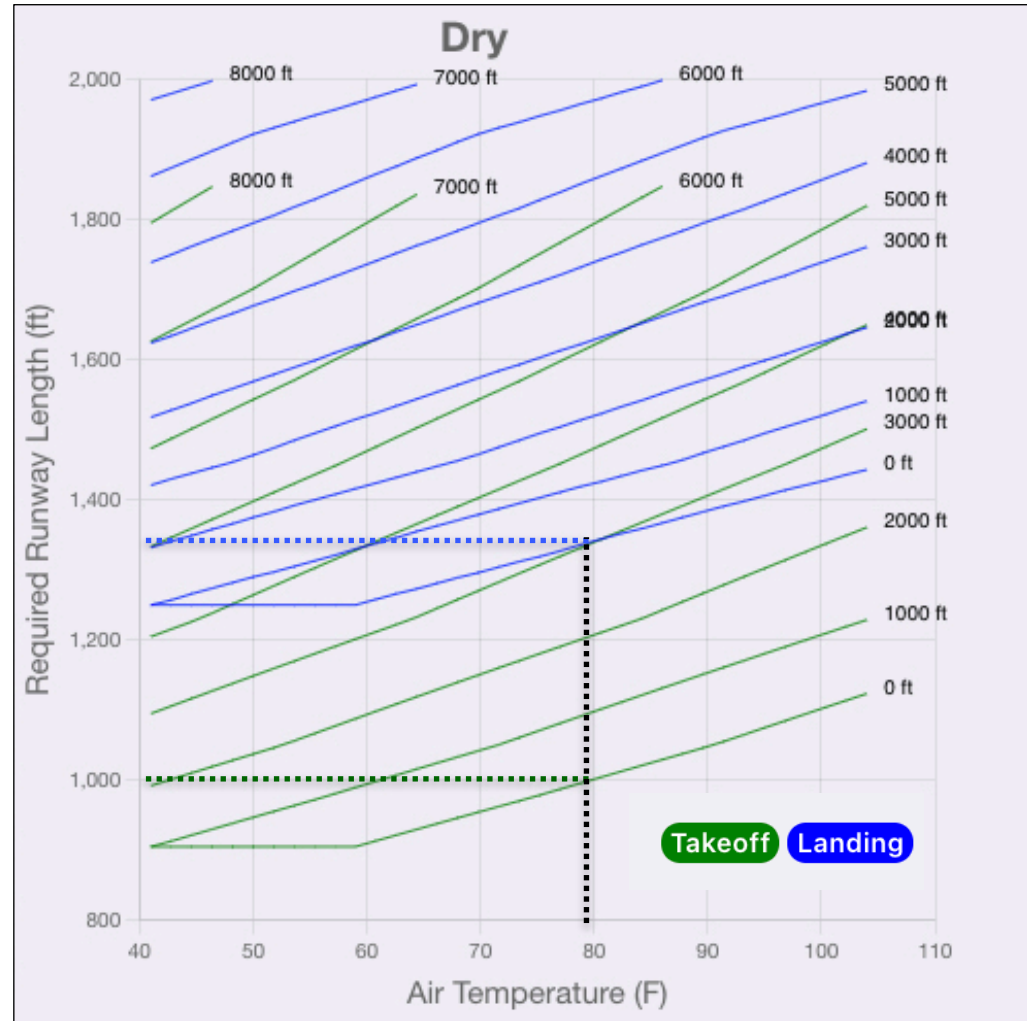


Virginia Tech Recommendation for LSA Aircraft

- Based on recent analysis at Virginia Tech for the FAA we recommend:
 - 1,000 ft for takeoff at sea level and 80 deg. F.
 - 1,350 ft** for landing at sea level at 80 deg. F.



Data for the Flight Design CTLS

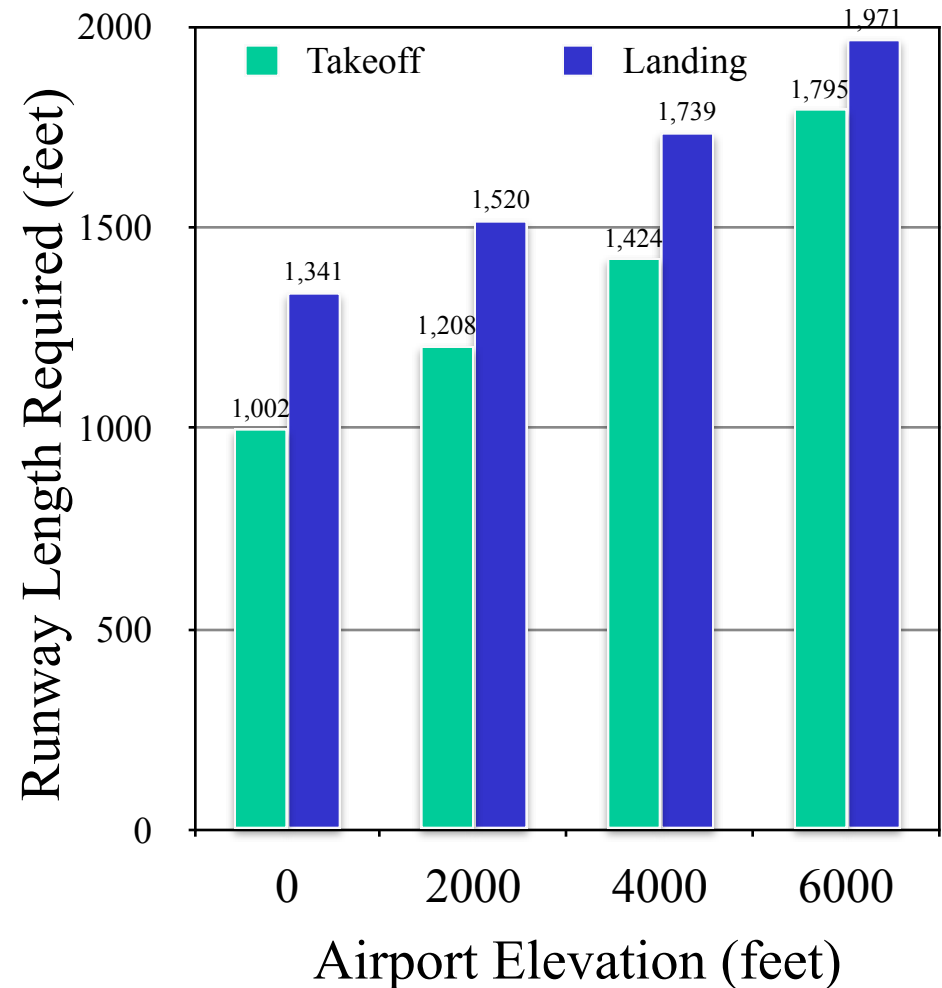


Small Aircraft Runway Length Analysis Tool

Analysis of LSA Aircraft performance Using SARLAT

<i>Airport Elevation (feet)</i>	<i>Takeoff Runway Length (feet)</i>	<i>Landing Runway Length (feet)</i>	<i>Delta from Datum Point (%)</i>
<i>Sea Level</i>	<i>1,002</i>	<i>1,341</i>	<i>0</i>
<i>2,000</i>	<i>1,208</i>	<i>1,520</i>	<i>13.3</i>
<i>4,000</i>	<i>1,424</i>	<i>1,739</i>	<i>29.7</i>
<i>6,000</i>	<i>1,795</i>	<i>1,971</i>	<i>47.0</i>

The actual LSA performance indicates an increase of 8% for each 1,000 feet in airport elevation



Small Aircraft Runway Length Analysis Tool



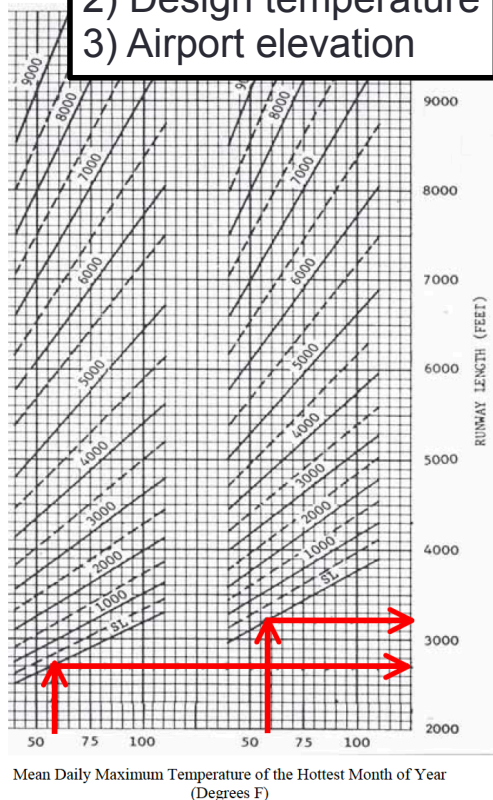
Small Airplanes with Approach Speeds > 50 knots or MTOW < 12,500 lb

- This group includes most of the General Aviation (GA) aircraft
- Use Figure 2-1 and 2-2 in the FAA AC 150/5325-4b
- **Figure 2-1**
 - Aircraft with less than 10 seats (excluding pilot and co-pilot)
 - Two family group designs (95% and 100% of the fleet)
- **Figure 2-2**
 - Aircraft with more than 10 seats (excluding pilot and co-pilot)

FAA AC 150/5325-4B Method to Estimate Runway Length

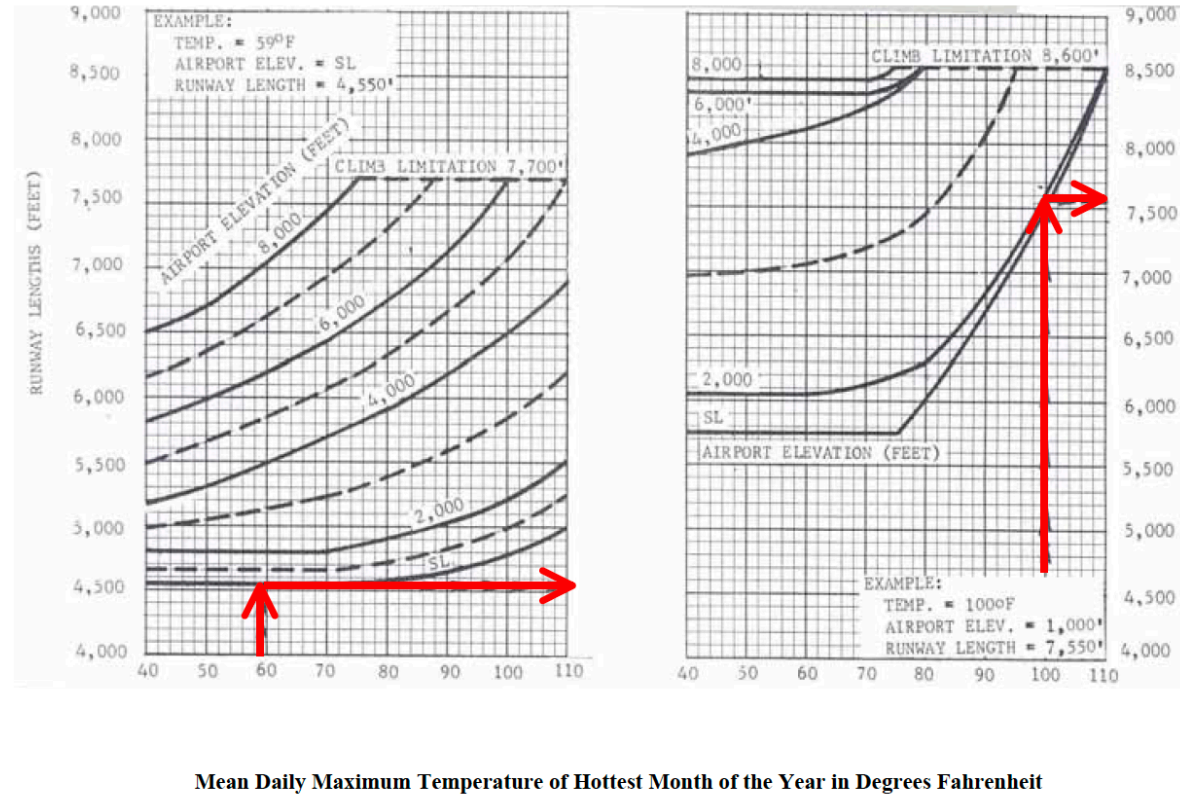
Inputs:

- 1) Fleet
- 2) Design temperature
- 3) Airport elevation



Aircraft with Max. Takeoff Weights
Up to 12,500 lbs.
(Chapter 2)

Figure 3-1. 75 Percent of Fleet at 60 or 90 Percent Useful Load

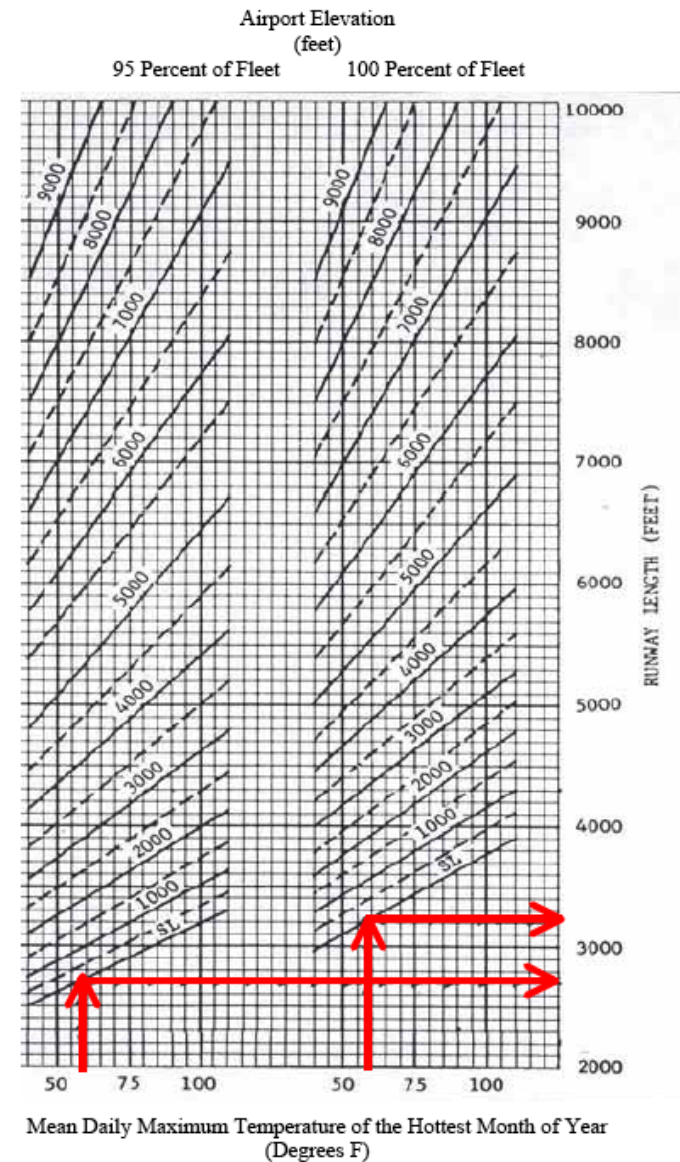
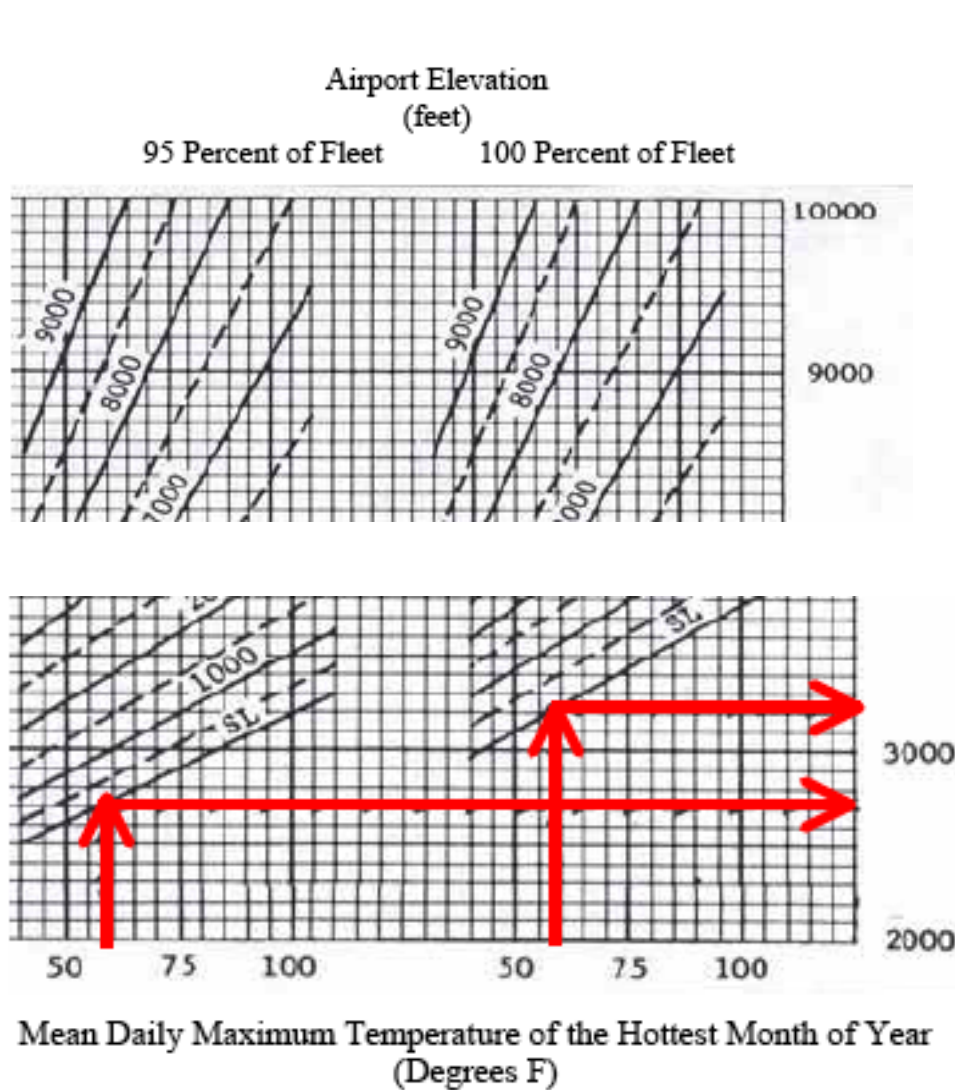


Mean Daily Maximum Temperature of Hottest Month of the Year in Degrees Fahrenheit

75 percent of feet at 60 percent useful load 75 percent of feet at 90 percent useful load

Aircraft with Max. Takeoff Weights
12,501 to 60,000 lbs.
(Chapter 3)

Figure 2-1 in AC 150/5325-4b





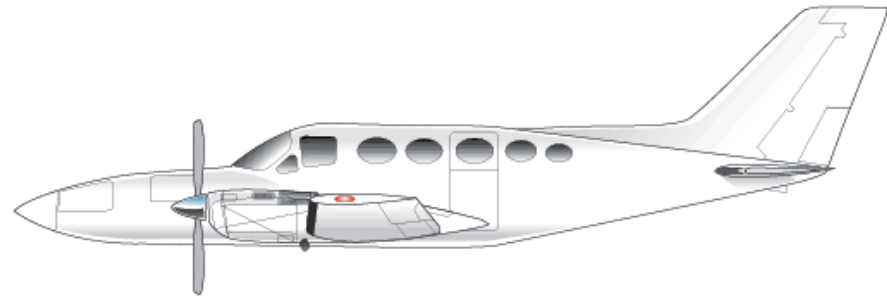
Selection of Percent of the Fleet

- **95 Percent of Fleet**
 - “This category applies to airports that are primarily intended to **serve medium size population communities** with a diversity of usage and a greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity”
- **100 Percent of Fleet**
 - “This type of airport is primarily intended to serve communities located on the fringe of **a metropolitan area or a relatively large population** remote from a metropolitan area”

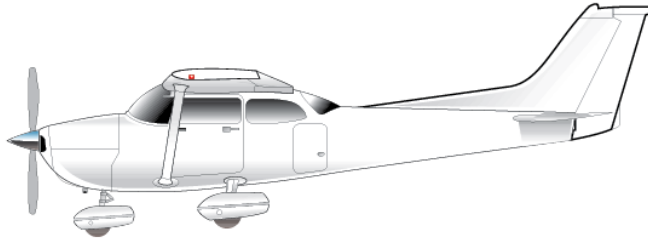
Small Aircraft < 10 seats (and <12,500 lbs)



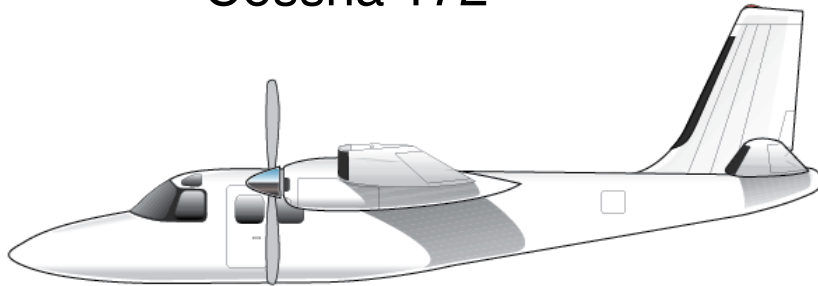
Beech Baron 58



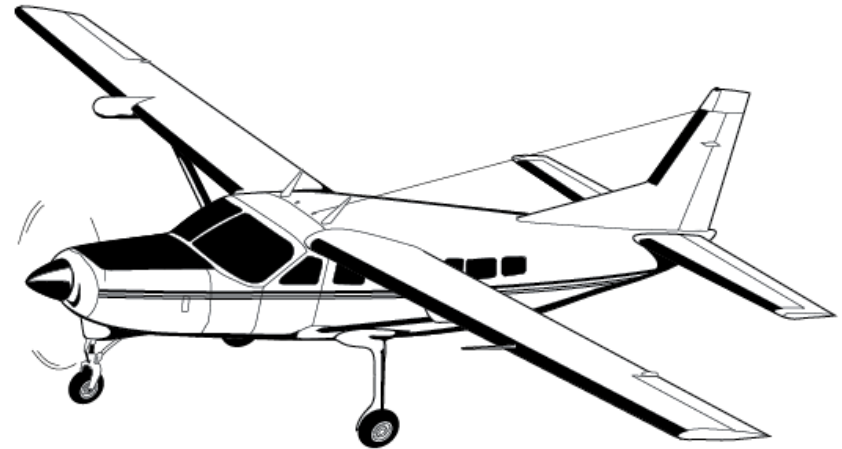
Cessna 421



Cessna 172

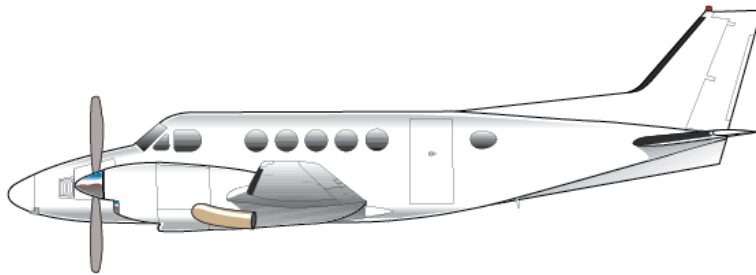


Shrike Commander



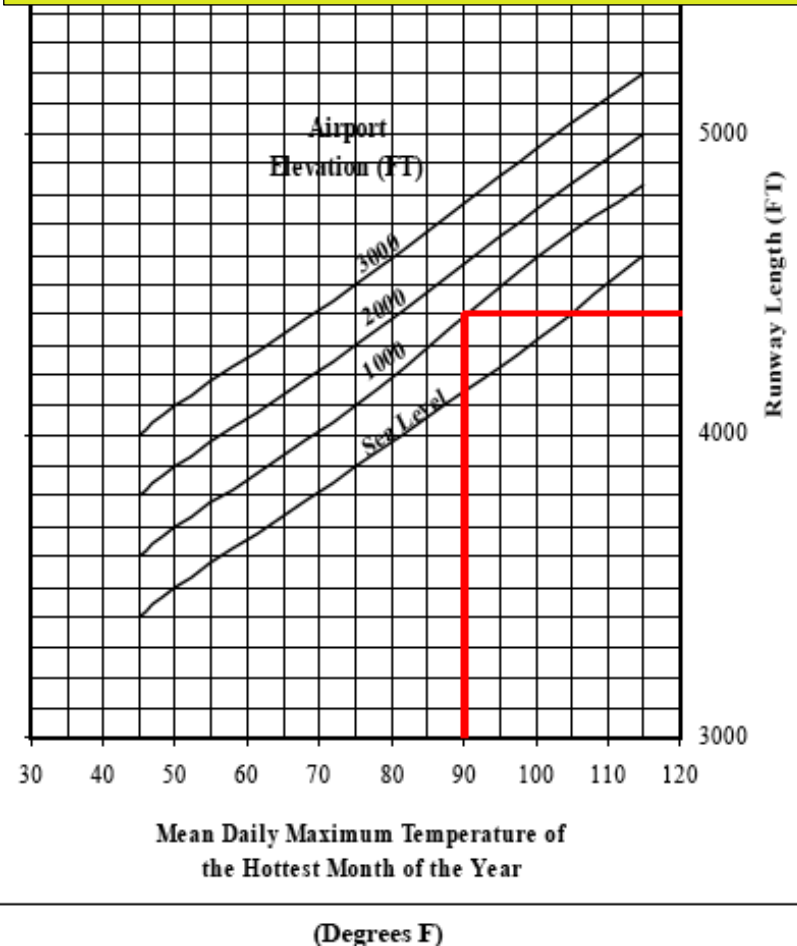
Cessna 208 Caravan

Figure 2-2 in AC 150/5325-4b



Raytheon Beech King
Air A100

For airfield elevations above 3,000 feet (914 meters) use the 100% fleet graph in Figure 2-1 instead of Figure 2-2



Raytheon B80 Queen Air
Raytheon E90 King Air
Raytheon B99 Airliner
Raytheon A100 King Air
(Raytheon formerly Beech Aircraft)

Britten-Norman
Mark III-I Trilander

Mitsubishi MU-2L

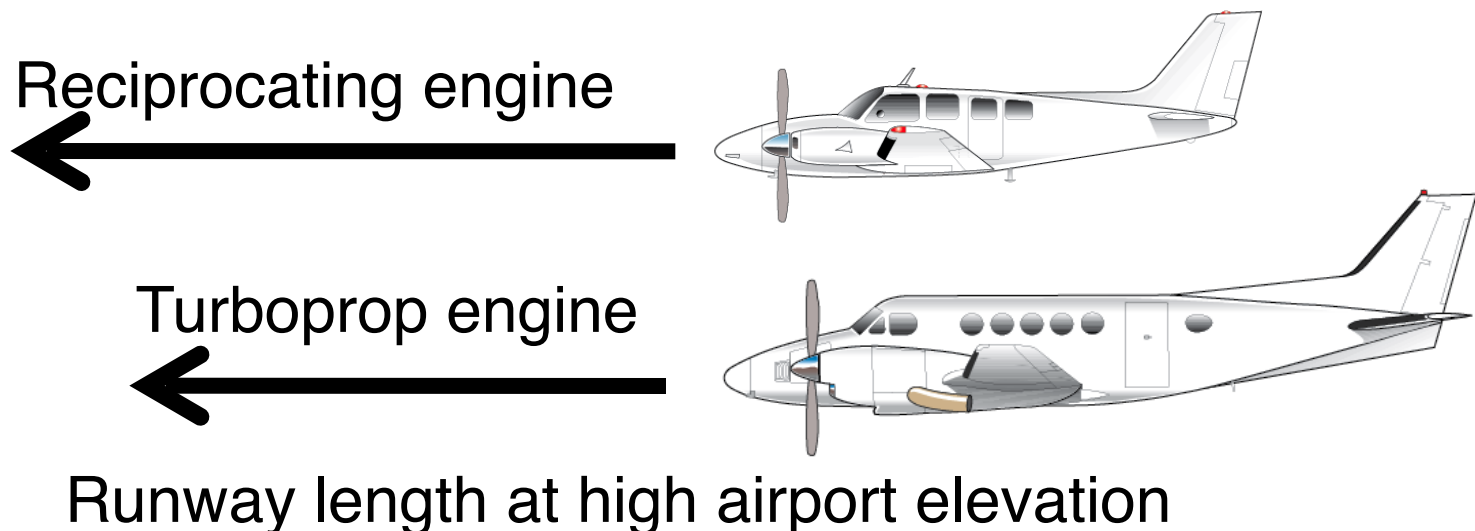
Swearigen Merlin III-A
Swearigen Merlin IV-A
Swearigen Metro II

Representative
Aircraft



Important Design Consideration

- For airfield elevations above 3,000 feet (914 meters) use the 100% fleet graph in Figure 2-1 instead of Figure 2-2
- Reason:
- Small aircraft in Figure 2-1 are have reciprocating engine technology that is more prone to “power” degradation with altitude that aircraft included in Figure 2-2





Representative Aircraft with More than 10 Seats



Raytheon Beechcraft King Air
360
ADG II and AAC B

Mitsubishi MU-2B 60 (Long)
ADG I and AAC B



Swearingen Merlin Metro III
ADG II and AAC B



Assumptions in the Development of Curves (applies to curves in Figure 2-1 and 2-2)

- Curves shown in Figures 2-1 and 2-2 comply with Federal Aviation Regulations (FAR) Part 23
- FAR Part 23 applies to the certification of small aircraft
- Assume the following conditions:
 - Zero wind
 - MTOW or MALW
 - Airport elevation and temperature are parameters
- A 10% increase in the runway length values has been accounted for to **compensate for humidity and runway gradient**



Assumptions in the Development of Curves (applies to Figure 2-2)

- Figure 2-2 includes **accelerate and stop distance** calculations for aircraft with more than 10 seats
- Figure 2-1 does not include accelerate and stop distance criteria
- In general, takeoff is the critical maneuver to determine runway length



Runway Length for Small Aircraft with MTOW > 12,500 lb (5,670 kg) and less than 60,000 lb (27,200 kg)

- Inputs to the procedure:
 - Airport elevation (above mean sea level)
 - Mean daily maximum temperature of the hottest month of the year
 - Use Figures 3-1 and 3-2 in AC 150/5325-4b
 - Requires adjustment for runway gradient or wet pavement (e.g., landing performance)



Runway Length for Small Aircraft with MTOW > 12,500 lb (5,670 kg) and less than 60,000 lb (27,200 kg)

- Use Tables 3-1 and 3-2 to determine the design group to use
- Determine the useful load factor (between 60% and 90%)
- Above 5,000 feet (airport elevations) the runway lengths for these aircraft might be less than those for smaller aircraft < 12,500 lb
- Curves are limited to 8,000 feet (2,439 meters)
- For higher elevations consult the aircraft manufacturers
- This procedure does not include runway length for air carriers

Explanation of Useful Load

Beechcraft King Air B350

- Useful load is the weight an aircraft can carry including:
 - Pilot(s)
 - Passengers
 - Baggage
 - Cargo
 - Usable fuel



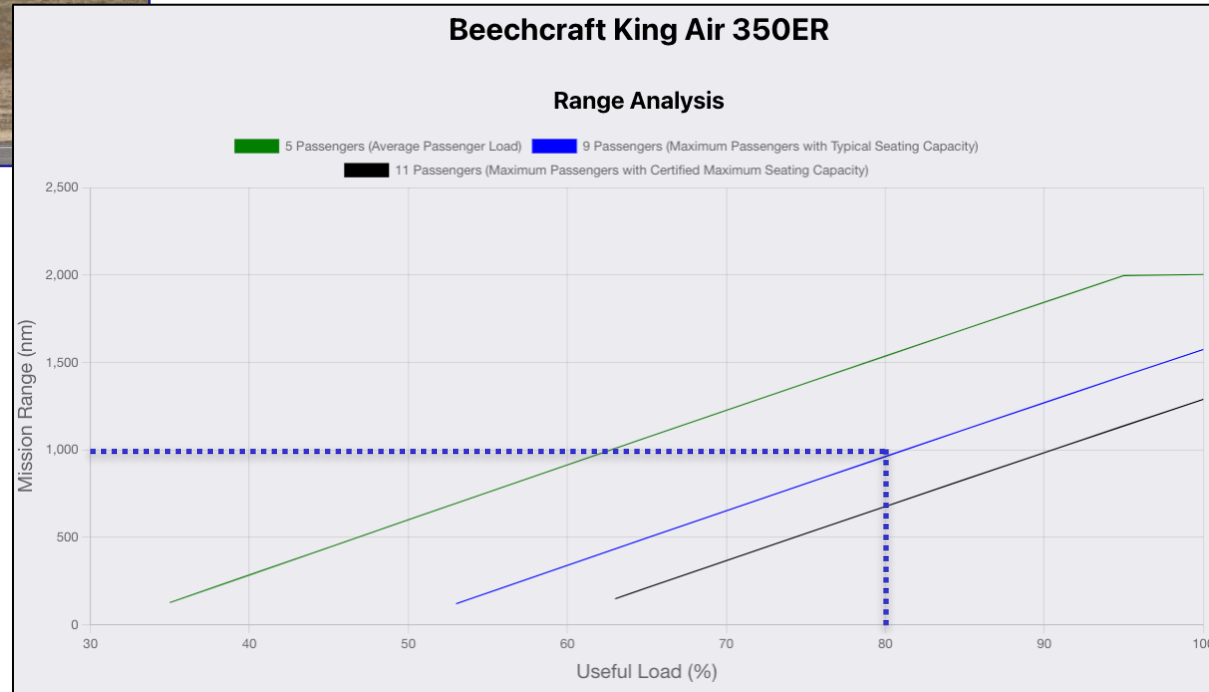
Aircraft Name	FAA Type Designator	Engine Type	Aircraft Design Group (ADG)	Aircraft Approach Category (AAC)	Weight Category	Operating Empty Weight (OEW)	Useful Load	Maximum Takeoff Weight (MTOW)	Maximum Allowable Landing Weight (MALW)
Turboprop									
Beechcraft King Air 350ER	B350	Turboprop	II	B	L	10385 lbs	6115 lbs	16500 lbs	15675 lbs

Source: SARLAT Tool



Useful Load and Mission Range

Beechcraft King Air B350



Source: SARLAT 2 Tool

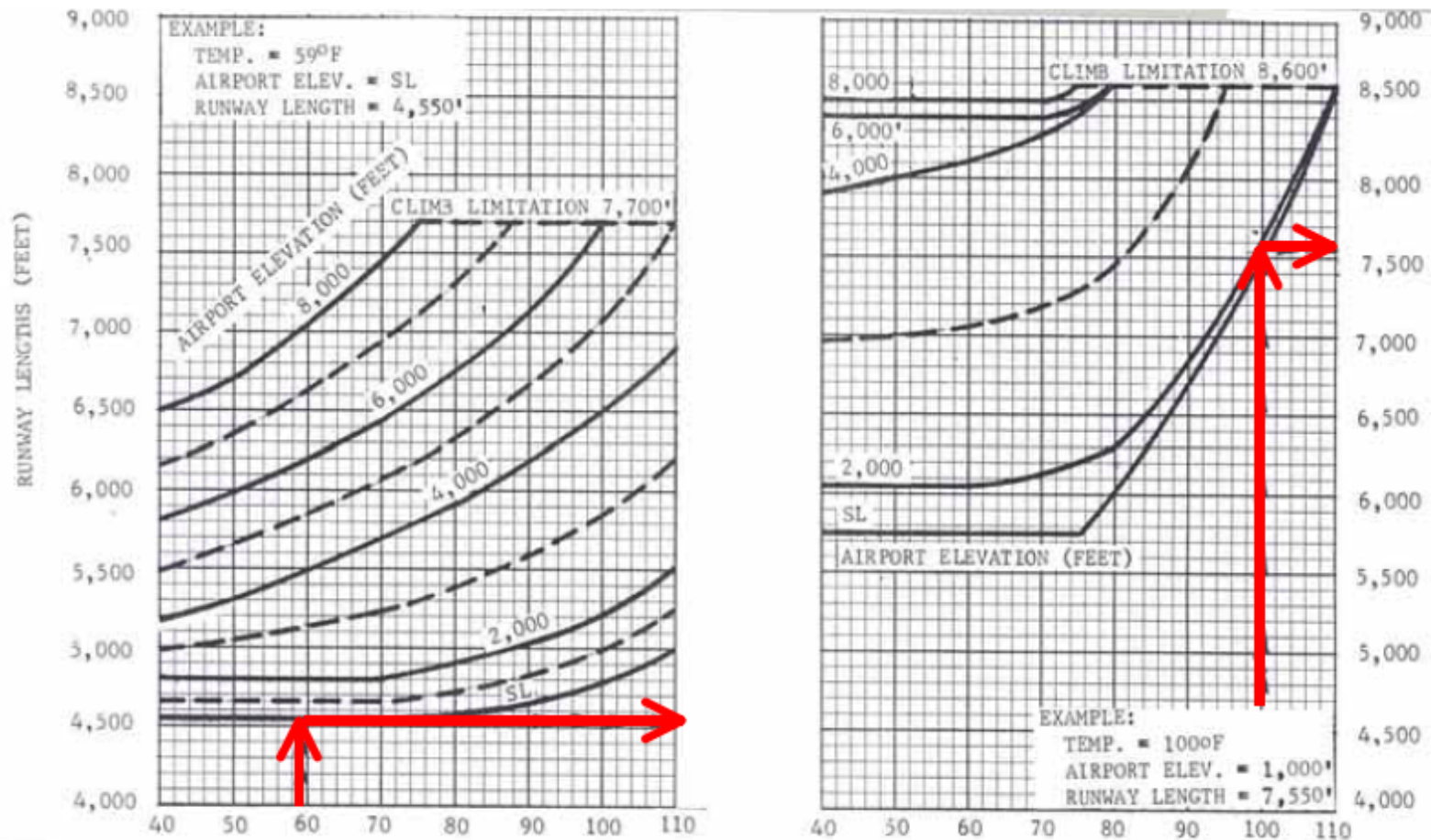
Passengers



Pilots Baggage Fuel

The Beechcraft King Air B350ER can fly 1000 nm with nine passengers, two pilots, and fuel. The takeoff useful load is 80%.

Figure 3-1 75% of Fleet (60 and 90% Useful Load)

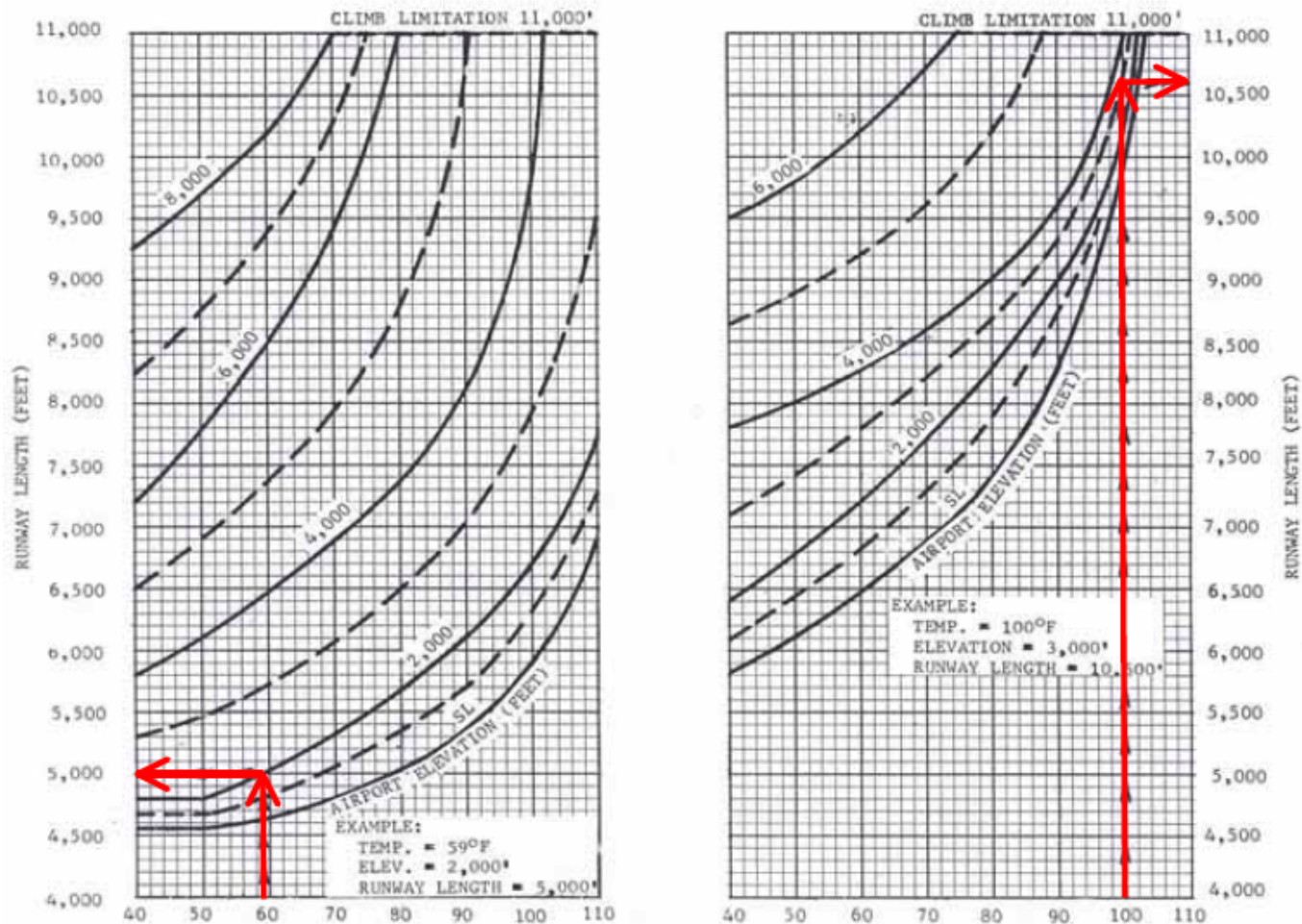


Mean Daily Maximum Temperature of Hottest Month of the Year in Degrees Fahrenheit

75 percent of feet at 60 percent useful load

75 percent of feet at 90 percent useful load

Figure 3-2 100% of Fleet (60 and 90% Useful Load)



Mean Daily Maximum Temperature of Hottest Month of the Year in Degrees Fahrenheit

100 percent of feet at 60 percent useful load

100 percent of feet at 90 percent useful load

Sample Aircraft in 75% of the Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bae	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501 Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A

Aircraft for Figure 3-1

Source: FAA AC 150/5325-4b



Cessna Citation CJ2



Bombardier Learjet 31A

Sample Aircraft in the Remaining 25% of the Fleet

Manufacturer	Model
Bae	Corporate 800/1000
Bombardier	600 Challenger
Bombardier	601/601-3A/3ER Challenger
Bombardier	604 Challenger
Bombardier	BD-100 Continental
Cessna	S550 Citation S/II
Cessna	650 Citation III/IV
Cessna	750 Citation X
Dassault	Falcon 900C/900EX
Dassault	Falcon 2000/2000EX

Source: FAA AC 150/5325-4b

Aircraft for Figure 3-2



Aircraft MTOW > 12,500 lb. (5,670 kg) and less than 60,000 lb. (27,200 kg)

Aircraft for Figure 3-1

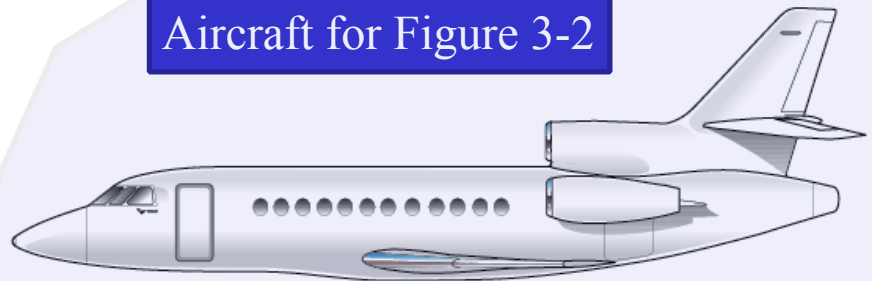


Beech King Air 350

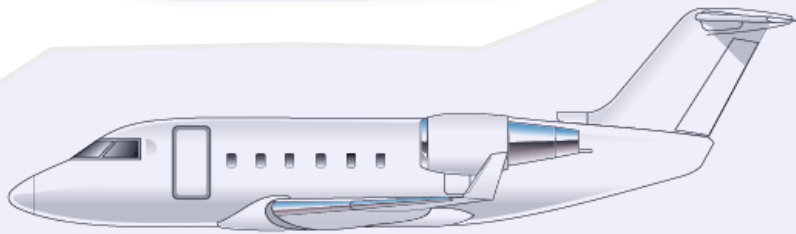


Cessna Citation II (550)

Aircraft for Figure 3-2



Dassault Falcon 900c



Bombardier CL 601



Cessna Citation X (750)



Runway Length Adjustments

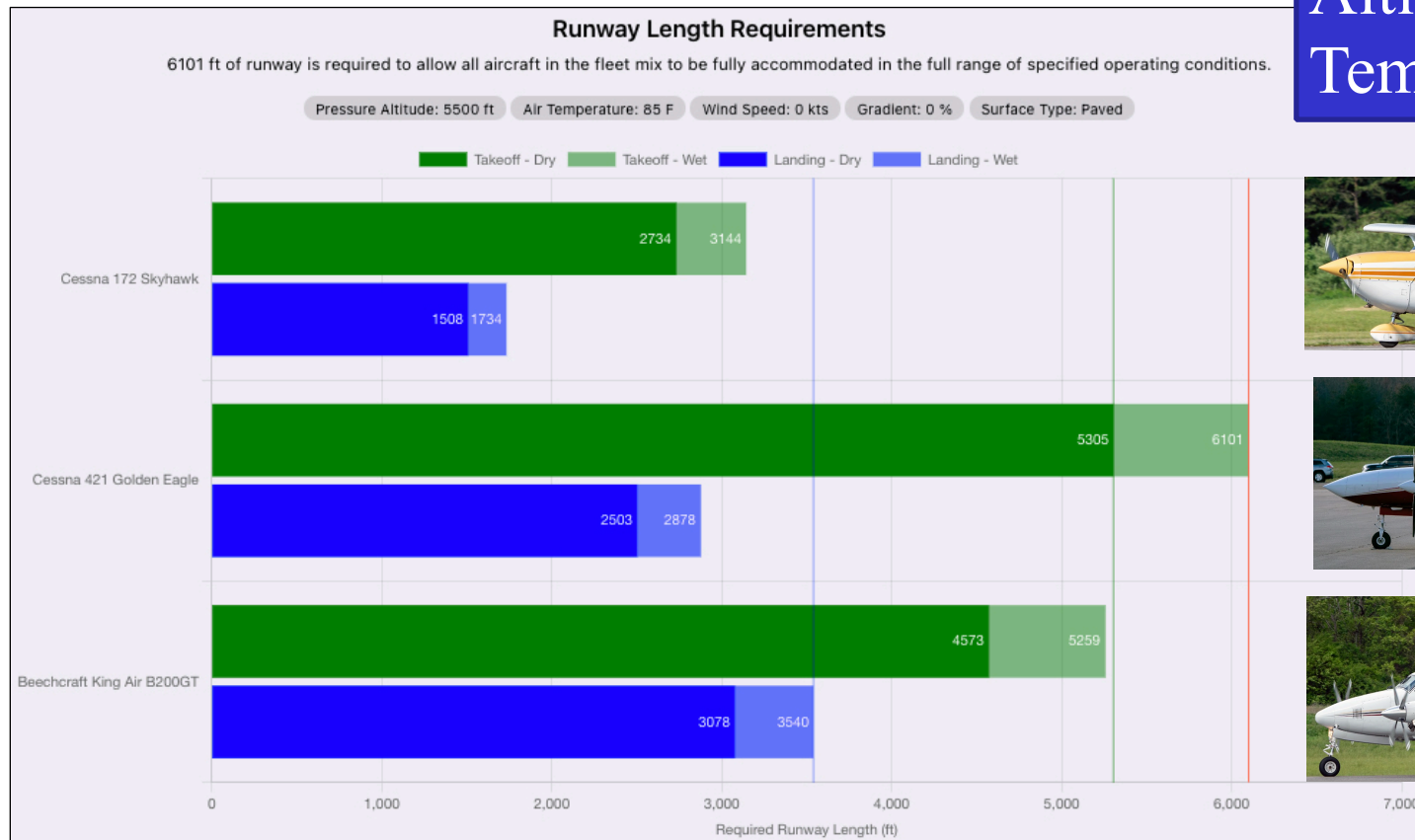
Small Aircraft MTOW > 12,500 lb (5,670 kg) and less than 60,000 lb (27,200 kg)

- Values shown in Figures 3-1 and 3-2 apply with zero wind conditions and dry runway pavements
- Effective **gradient correction** (**takeoff case**)
 - Increase runway length by 10 feet (3.05 meters) for every foot (0.305 meters) of runway elevation difference (low-high)
- **Wet and slippery runway** correction (**landing case**)
 - Increase values obtained using the 60% useful load by 15% (for turbojet powered aircraft) up to 5,500 feet whichever is less
 - Increase values obtained using the 90% useful load by 15% (for turbojet powered aircraft) up to 7,000 feet whichever is less

Final Note on Runway Length for Small Aircraft

- For high elevation airports, the performance of smaller aircraft below 12,500 lb may be critical
- Example analysis using the SARLAT tool.
- The Cessna 421C (piston-powered) is the critical aircraft

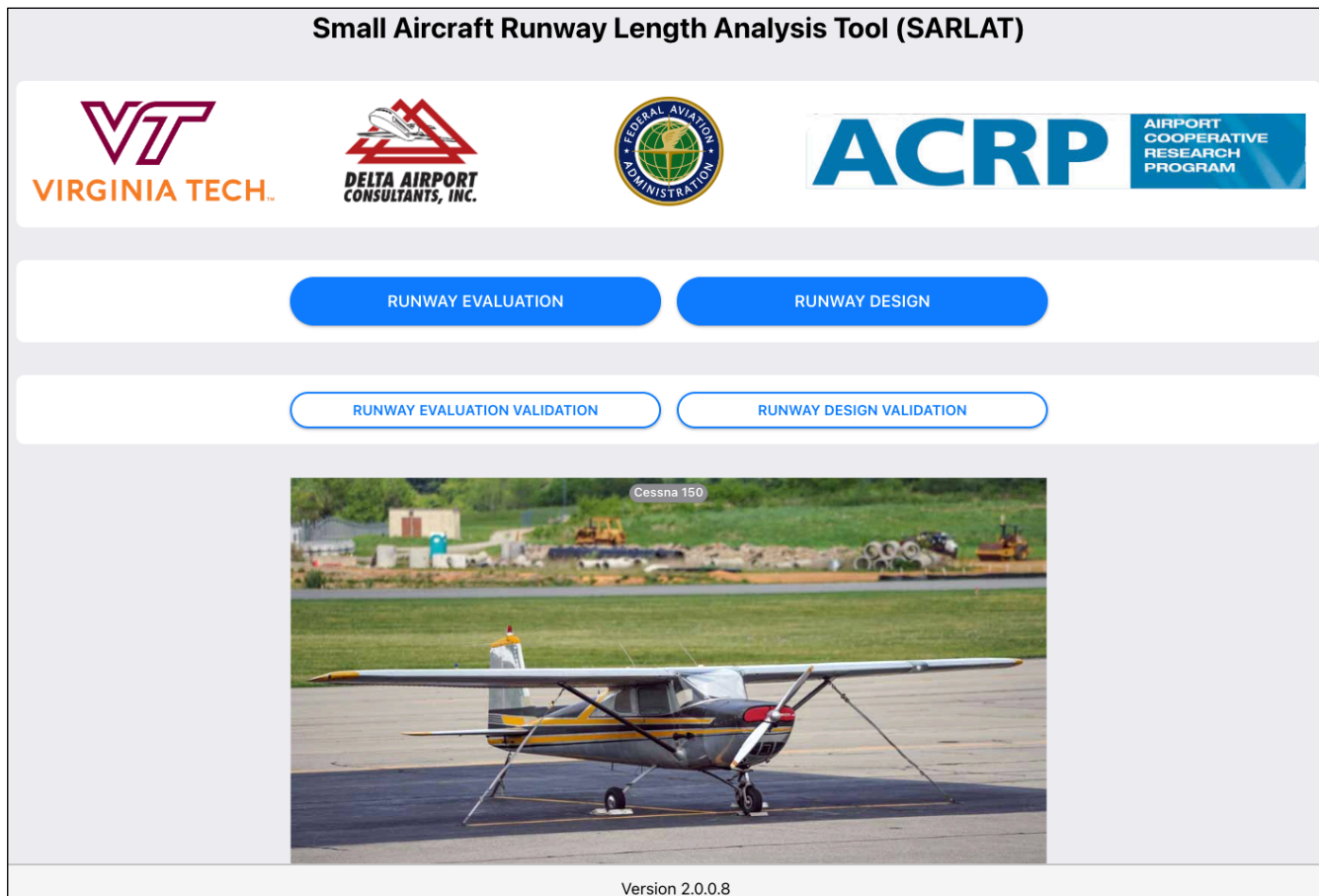
Altitude = 5,500 ft
Temp. 85 deg. F





Small Aircraft Runway Analysis Tool (SARLAT)

Computer Software Tool to Estimate Runway length for Small Aircraft



SARLAT Tool

- Stand-alone tool
- Consider individual aircraft performance
- Consider all airport design factors
 - Temperature
 - Wind conditions
 - Airport elevation
 - Aircraft climb limits (if applicable)
 - Aircraft useful load
- Produce runway length requirements for both takeoff and landing conditions

SARLAT uses Javascript and Matlab
Runs on Windows and Mac OS systems

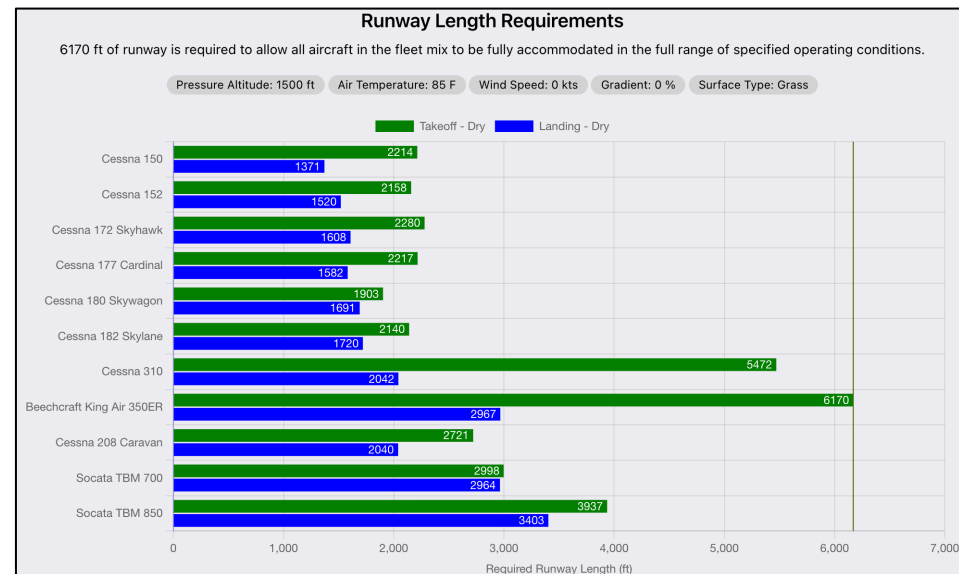
Small Aircraft Runway Length Analysis Tool (SARLAT)

Logos: VIRGINIA TECH., DELTA AIRPORT CONSULTANTS, INC., FEDERAL AVIATION ADMINISTRATION, ACRP AIRPORT COOPERATIVE RESEARCH PROGRAM

Buttons: Runway Evaluation, Runway Design, Runway Evaluation Validation, Runway Design Validation



Version 1.2.8

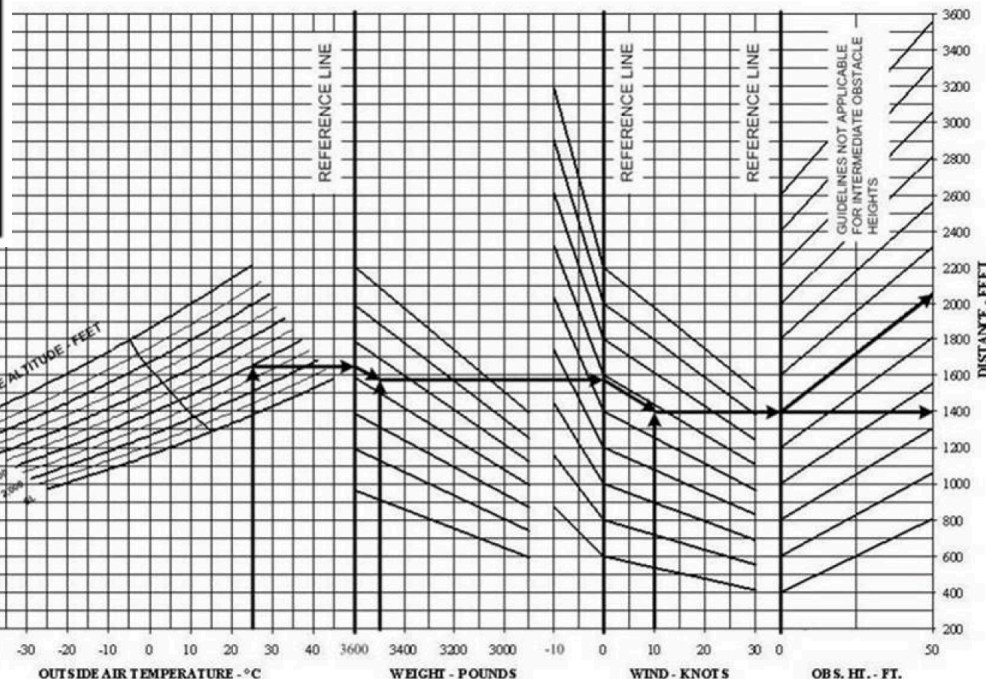


SARLAT 2 : Data Gathering and Analysis

Cessna Citation 560XL



WEIGHT = 16500 POUNDS					
VREF = 111 KIAS		VAPP = 117 KIAS			
TEMP DEG C	TAILWIND 10 KTS	ZERO WIND	HEADWINDS		
			10 KTS	20 KTS	30 KTS
-25	3290	2760	2600	2450	2300
-20	3330	2790	2640	2490	2340
-15	3370	2830	2680	2520	2370
-10	3410	2870	2710	2560	2410
-5	3450	2910	2750	2600	2450
0	3490	2950	2790	2640	2490
5	3540	2990	2830	2670	2520
10	3580	3030	2870	2710	2560
15	3620	3070	2910	2750	2600
20	3660	3110	2950	2790	2630
25	3710	3150	2990	2830	2670
30	3750	3190	3020	2860	2710
35	3790	3230	3060	2900	2740
40	3830	3270	3100	2940	2780
45	3870	3310	3140	2980	2820
50	3910	3340	3180	3010	2850



Columbia 400

SARLAT 2 : Translate Data Into a Common Graphical Format



Cessna Citation Jet 3 Data

Climb Limits
Considered

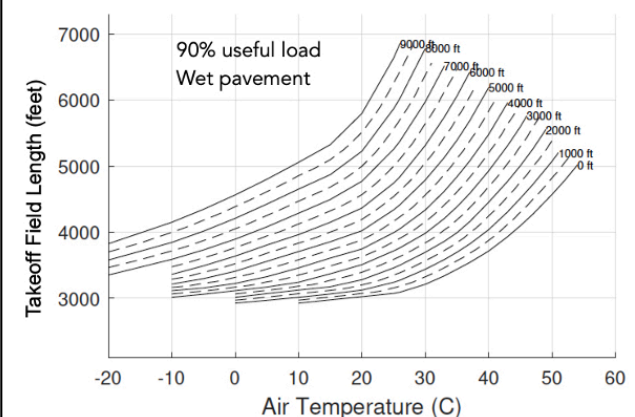
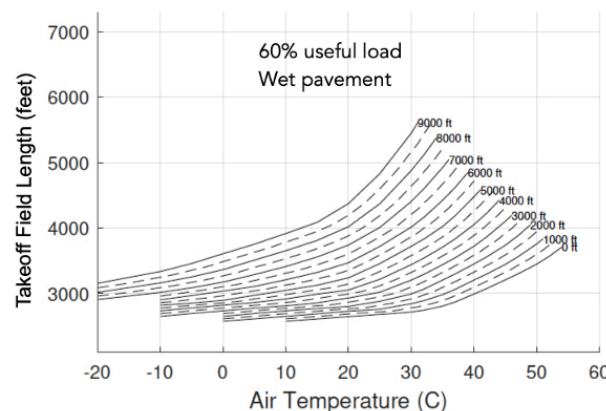
Intermediate Step

Final Presentation
In SARLAT

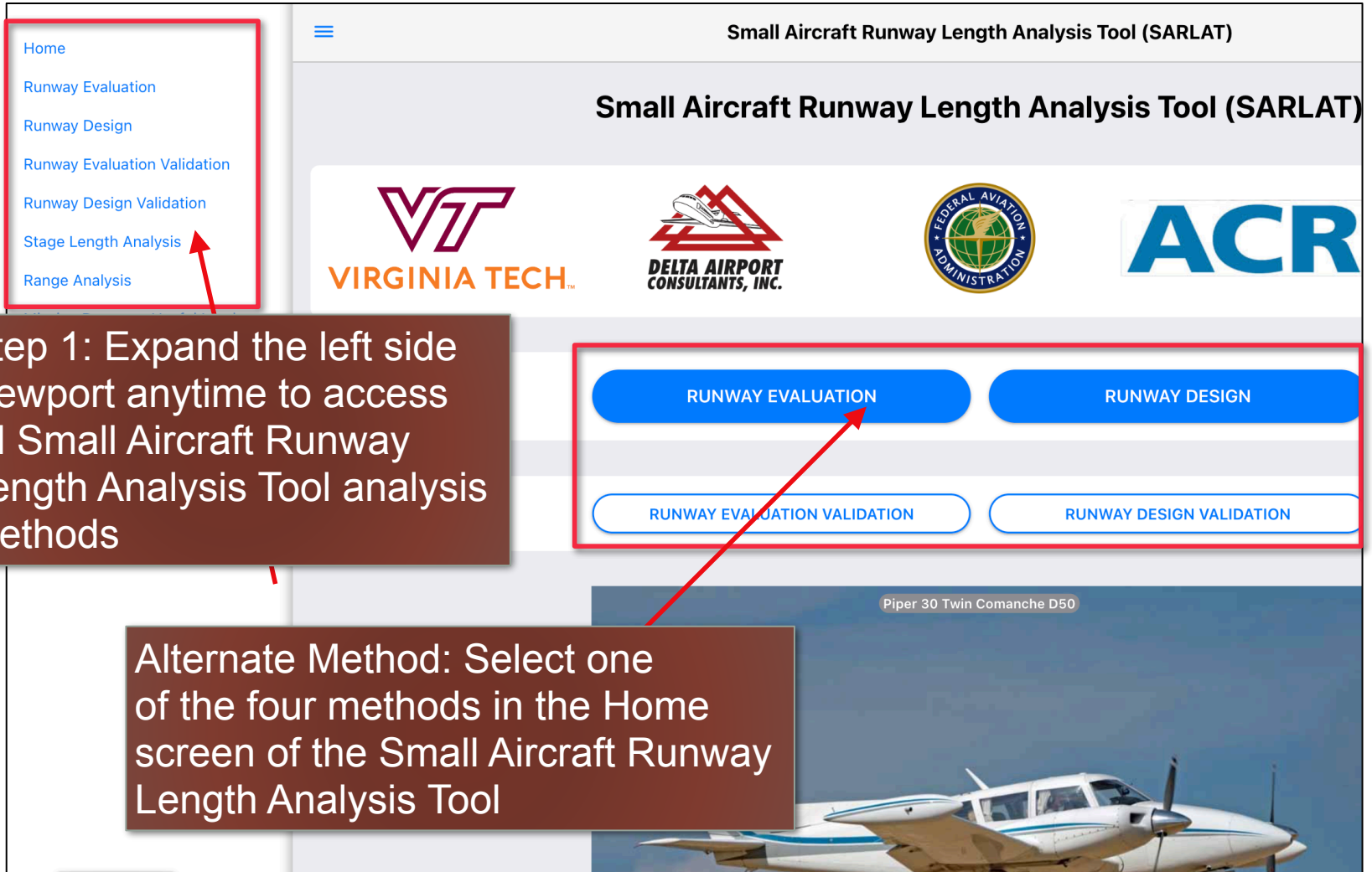
Elevation = Sea Level									
Ambient Temp		Takeoff Weight (lb)							
°C / °F		13,870	13,400	13,000	12,500	12,000	11,500	11,000	10,000
10 / 50		3,130	2,940	2,820	2,700	2,580	2,570	2,580	2,640
15 / 59		3,180	2,990	2,870	2,740	2,620	2,600	2,610	2,670
20 / 68		3,230	3,040	2,910	2,780	2,660	2,630	2,650	2,710
25 / 77		3,290	3,090	2,960	2,820	2,700	2,660	2,680	2,740
30 / 86		3,440	3,230	3,070	2,900	2,770	2,640	2,630	2,680
35 / 95		3,690	3,460	3,280	3,060	2,860	2,720	2,600	2,570
40 / 104		4,030	3,740	3,530	3,290	3,070	2,850	2,680	2,450
45 / 113		4,480	4,130	3,850	3,540	3,290	3,060	2,840	2,510
50 / 122		5,050	4,610	4,280	3,900	3,550	3,280	3,040	2,600
55 / 131		—	5,180	4,770	4,310	3,910	3,550	3,240	2,760
Climb Wght Temp Limits °C/°F		54/129	55/131	55/131	55/131	55/131	55/131	55/131	55/131
Field Length at Temp Limits (ft)		5,580	5,180	4,770	4,310	3,910	3,550	3,240	2,760

Elevation = 3,000 Feet									
Ambient Temp		Takeoff Weight (lb)							
°C / °F		13,870	13,400	13,000	12,500	12,000	11,500	11,000	10,000
-10 / 14		3,220	3,030	2,910	2,780	2,660	2,640	2,660	2,720
0 / 32		3,330	3,130	3,010	2,870	2,750	2,720	2,740	2,800
10 / 50		3,470	3,260	3,110	2,980	2,840	2,780	2,790	2,850
15 / 59		3,610	3,390	3,220	3,040	2,910	2,780	2,770	2,810
20 / 68		3,760	3,530	3,340	3,120	2,980	2,840	2,740	2,780
25 / 77		4,000	3,740	3,540	3,300	3,080	2,920	2,780	2,700
30 / 86		4,330	4,010	3,790	3,530	3,290	3,050	2,870	2,600
35 / 95		4,800	4,420	4,110	3,800	3,530	3,280	3,040	2,680
40 / 104		5,450	4,970	4,610	4,200	3,830	3,540	3,270	2,800
45 / 113		—	5,650	5,190	4,690	4,250	3,850	3,510	2,990
Climb Wght Temp Limits °C/°F		44/111	47/117	47/117	47/117	47/117	47/117	47/117	47/117
Field Length at Temp Limits (ft)		6,080	5,980	5,470	4,920	4,440	4,010	3,640	3,070

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1		-20	-10	-5	0	5	10	15	20	24	25	27	30	31	34	35	37	40	41	44	45	48	50
2	0						3120	3176	3230	3280	3340	3429	3460	3539	3690	3740	3904	3970	4130	4420	4521	4850	5050
3	1000						3230	3274	3330	3400	3520	3666	3710	3803	3970	4034	4263	4350	4547	4890	5011	5407	5650
4	2000						3330	3391	3470	3610	3760	3945	4000	4118	4330	4411	4693	4800	5038	5450	5597	6030	
5	3000						3440	3529	3650	3810	3990	4180	4380	4664	4750	4937	5270	5394	5822	5980	6340		
6	4000						3557	3710	3870	4050	4282	4350	4491	4740	4839	5197	5330	5617	6110	6300			
7	5000						3650	3810	3990	4180	4380	4664	4750	4937	5270	5394	5822	5980	6340				
8	6000						3751	3920	4110	4320	4530	4780	5099	5200	5439	5880	6041	6590					
9	7000						3860	4038	4240	4460	4690	4920	5240	5559	5790	6100	6670	6890					
10	8000						3980	4180	4400	4640	4880	5120	5440	5760	6070	6640	6860						
11	9000						4150	4380	4630	4880	5130	5380	5700	6020	6330	6900	7120						



Small Aircraft Runway Length Analysis Tool Menu Structure and Interface



Home
Runway Evaluation
Runway Design
Runway Evaluation Validation
Runway Design Validation
Stage Length Analysis
Range Analysis

Small Aircraft Runway Length Analysis Tool (SARLAT)

Small Aircraft Runway Length Analysis Tool (SARLAT)

VIRGINIA TECH. DELTA AIRPORT CONSULTANTS, INC. FEDERAL AVIATION ADMINISTRATION ACR

RUNWAY EVALUATION RUNWAY DESIGN

RUNWAY EVALUATION VALIDATION RUNWAY DESIGN VALIDATION

Piper 30 Twin Comanche D50

Step 1: Expand the left side viewport anytime to access all Small Aircraft Runway Length Analysis Tool analysis methods

Alternate Method: Select one of the four methods in the Home screen of the Small Aircraft Runway Length Analysis Tool