
APPENDIX D: RUNWAY LENGTH ANALYSIS

Purpose

A runway length analysis was completed to FAA standards identified in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* in this airport master plan study for the Laurel Municipal Airport (6S8). Due to the technical nature of this analysis, a separate appendix has been prepared to calculate recommended runway lengths for the design aircraft identified in the aviation forecasts.

Small Airplanes Up to 12,500 Pounds

FAA Design Curves

The FAA design approach identified in Chapter 2 of FAA AC 150/5325-4B for most small aircraft less than 12,500 pounds requires several steps to be performed to determine runway length:

1. **Identify Number of Passenger Seats:** Classify design aircraft as one of two categories; “Less than 10 Passenger Seats” and “10 Passenger Seats or Greater”
2. **Select Percentage of Fleet:** Airplanes classified as “Less than 10 Passenger Seats” are grouped into two percentage categories based on the airport’s location and the amount of existing or planned aviation activities. The categories include “95 Percent of Fleet” and “100 Percent of Fleet”.
3. **Consider Future Airport Expansion:** Consider runway length requirements during Instrument Meteorological Conditions (IMC) or expansions to accommodate airplanes more than 12,500 pounds.
4. **Determine Airport Data:** Evaluate the airport elevation, mean daily temperature in hottest month and runway condition to adjust runway length.
5. **Calculate Runway Length Based on Curves:** Utilize FAA runway length curves published in AC 150/5325-4B.

Table D-1 – FAA AC 150/5345-4B Runway Length Requirements (\leq 12,500 lbs.)

Airport and Runway Data		
Longest Runway Length (Runway 4-22)	5,199 feet	
Airport Elevation	3,542.59 feet	
Mean Daily Maximum Temperature of Hottest Month	88.7°F	
Aircraft Classification	Recommended Runway Length	
Small Airplanes 12,500 Pounds or less		
Less than 10 passenger seats at 100 percent of fleet	5,290 feet	
Less than 10 passenger seats at 95 percent of fleet	4,825 feet	
Small Aircraft Runway Length Analysis Tool	Dry	Wet
Beechcraft Baron 55	4,785 feet	5,503 feet
Beechcraft Baron 58	4,601 feet	5,291 feet
Cessna 310	5,752 feet	6,615 feet
Cessna 340	5,059 feet	5,818 feet
Cessna 402B	4,637 feet	5,333 feet
Cessna 421	5,409 feet	6,220 feet
Cessna Citation Jet 3	4,687 feet	5,390 feet

Source: [FAA AC 150/5325-4B](#), KLJ Analysis

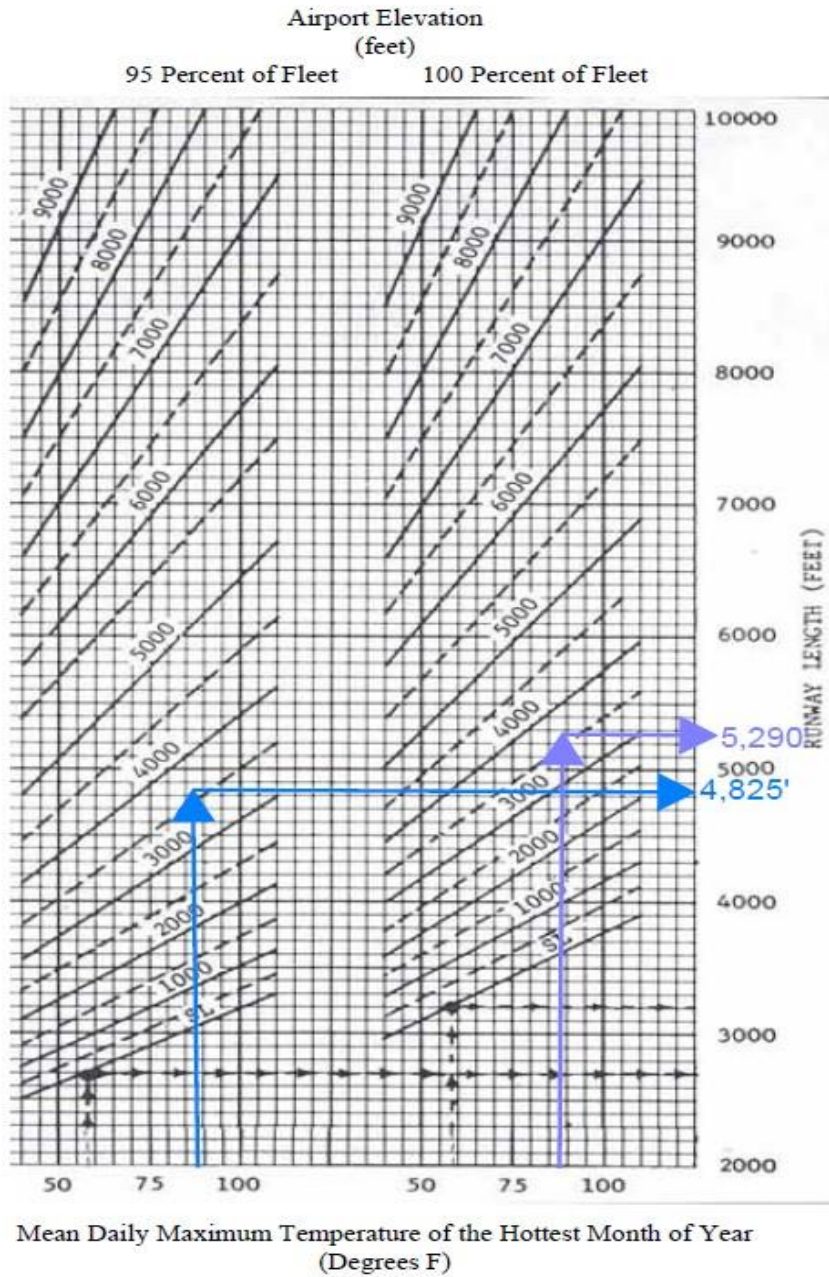
Notes: With airport elevation greater than 3,000' MSL, Table 2-1 at 100% fleet is used. Runway length requirements estimated based on charts for airport planning purposes only. **Bold** indicates lengths greater than current runway length.

For other small general aviation aircraft, the FAA runway length requirements of 100 percent of fleet would apply at 6S8 due to its number of current and forecasted operations. The recommended runway length for small general aviation aircraft is **5,290 feet** which is 91 feet less than Runway 4-22 at 5,199 feet long.

For small general aviation flight training aircraft, the FAA runway length requirements of 95 percent of fleet would apply at 6S8 and the recommended runway length to accommodate those aircraft is **4,825 feet**. This matches the existing runway length for Runway 4-22.

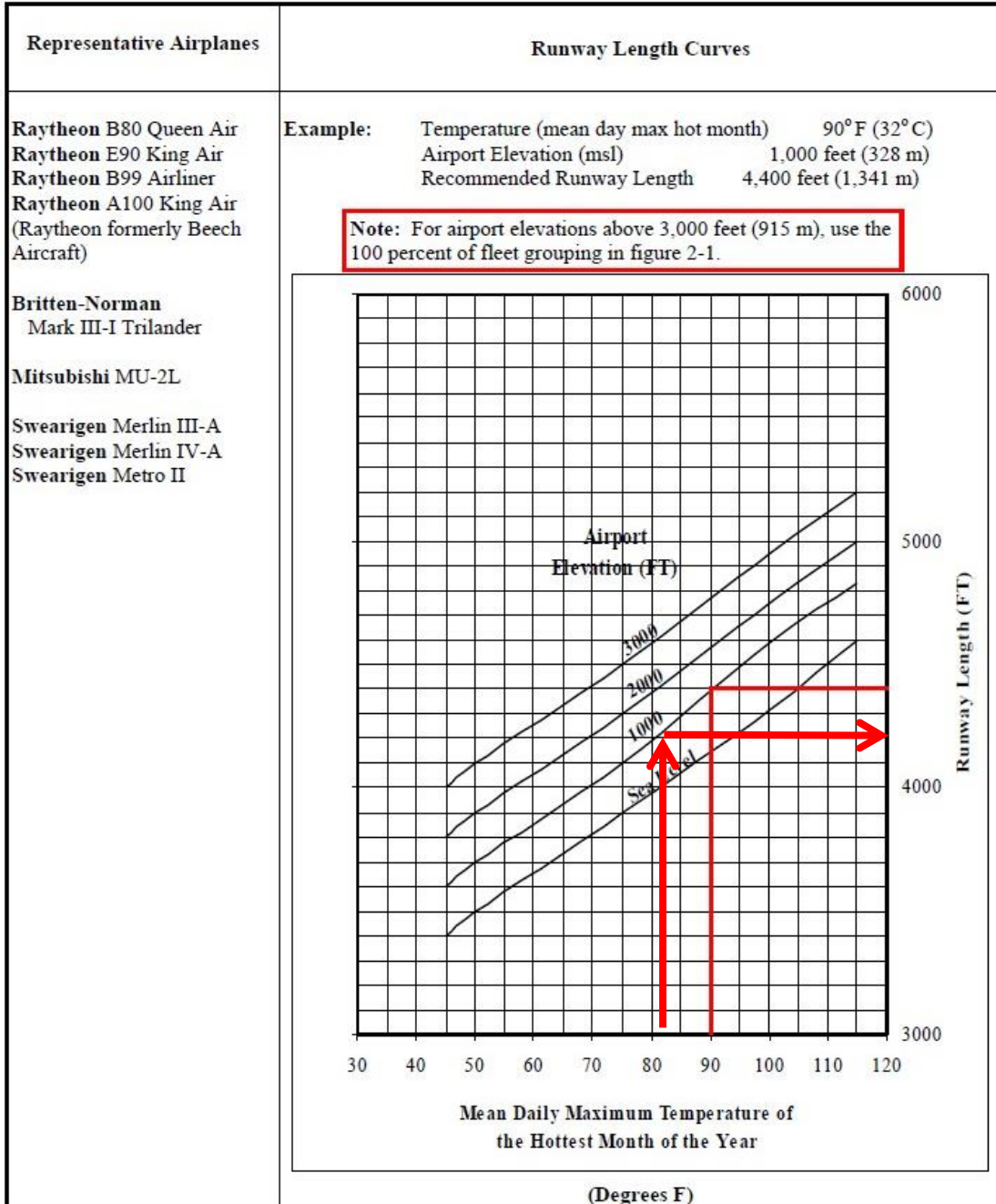
FAA Figure 2-1: Small Airplanes with Fewer than 10 Passenger Seats (Excludes Pilot and Co-pilot)

Laurel Municipal Airport
Temperature: 88.7°F / 31.5°C - Airport Elevation: 3,542' MSL



FAA Figure 2-2: Small Airplanes Having 10 or More Passenger Seats (Excludes Pilot and Co-pilot)

Laurel Municipal Airport
 Temperature: 88.7°F / 31.5°C - Airport Elevation: 3,542' MSL



Recommended Runway Length: 5,290 feet

Individual Aircraft

The Airport Cooperative Research Program (ACRP) released the Small Aircraft Runway Length Analysis Tool (SARLAT) in late 2022. This tool allows multiple general aviation aircraft to be applied to the airport environment to evaluate the runway length needed for said airport. It is also recommended to use airplane flight manuals in lieu of Figure 2-1 or 2-2. We applied the aircraft listed in **Table D-1** along with some other frequent aircraft seen at Laurel, and the SARLAT calculated the takeoff and landing length needed in wet and dry conditions.

The results the tool provides can be seen in **Figure D-1**. The piston aircraft (Beechcraft 55 Baron to the Piper 28B Dakota) have an AAC of A/B and an ADG-I and maximum takeoff weight (MTOW) between 1,600 lbs. and 7,200 lbs. The turboprop aircraft (Beechcraft King Air B200GT to the Socata TBM 850) are AAC-A/B and ADG-I/II with MTOW of 5,000 lbs. to 12,500 lbs. Finally, the Cessna Citation Jet 3 is a jet aircraft AAC-B and ADG-II with a MTOW of 12,870 lbs.

Table D-1 shows the aircraft with the most runway length required for landing and takeoff in dry and wet conditions at 6S8. The longest runway needed is **6,615 feet** for a Cessna 310 taking off on a wet surface.

SARLAT does not have all general aviation listed in the program and it was important to evaluate the Air Tractor 402's landing and takeoff distance needed since it is a frequent aircraft seen at the airport. It was determined that **3,200 feet** were needed for takeoff which is well within the current length of Runway 4-22 at 5,199 feet. This information can be seen in **Figure D-2**.

At Laurel some aircraft can sometimes be operated commercially (i.e. Air Taxi) under [FAR Part 135, Operating Requirements: Commuter and On-Demand Operations](#), this aircraft is considered a small turbine-powered transport category airplane. Small transport category airplanes are required to follow [FAR Part 135.385](#) to calculate runway length during landing. This standard requires a full-stop landing within 60 percent of the effective length of the runway. The required runway length when operating under FAR Part 135 under dry and wet conditions can be seen in **Figure D-1** in light purple. The King Air B200 and PC-12 can operate under Part 135 and need a maximum runway length of **4,708 feet**.

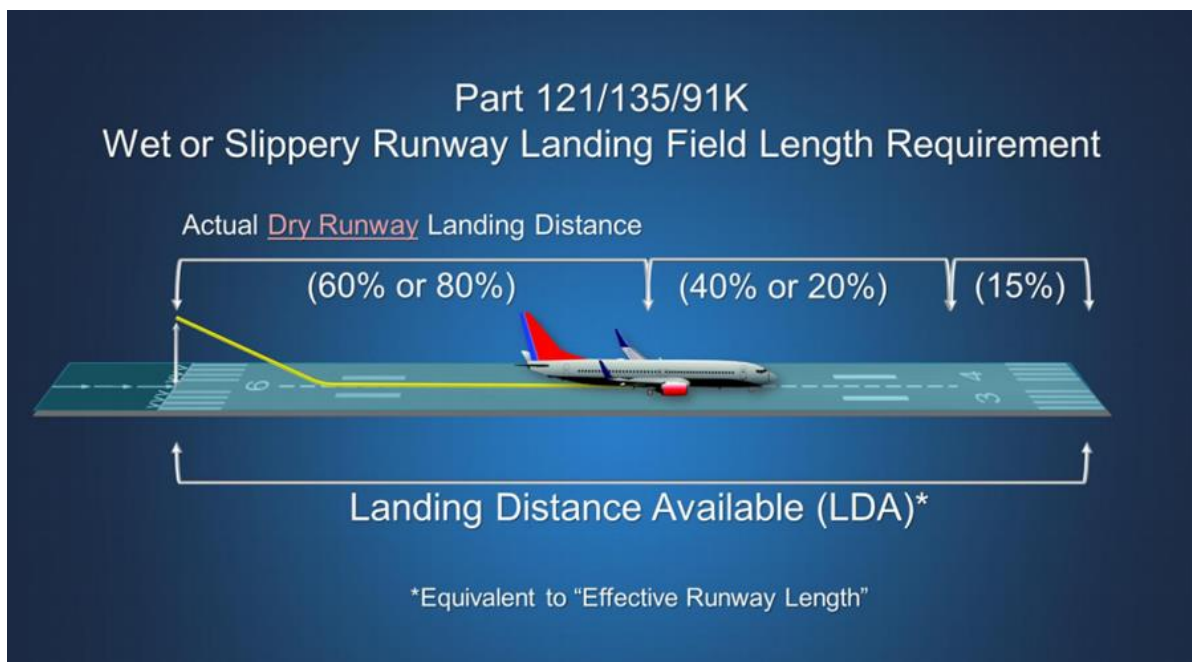


Figure D-1 – SARLAT Runway Design Analysis for 6S8

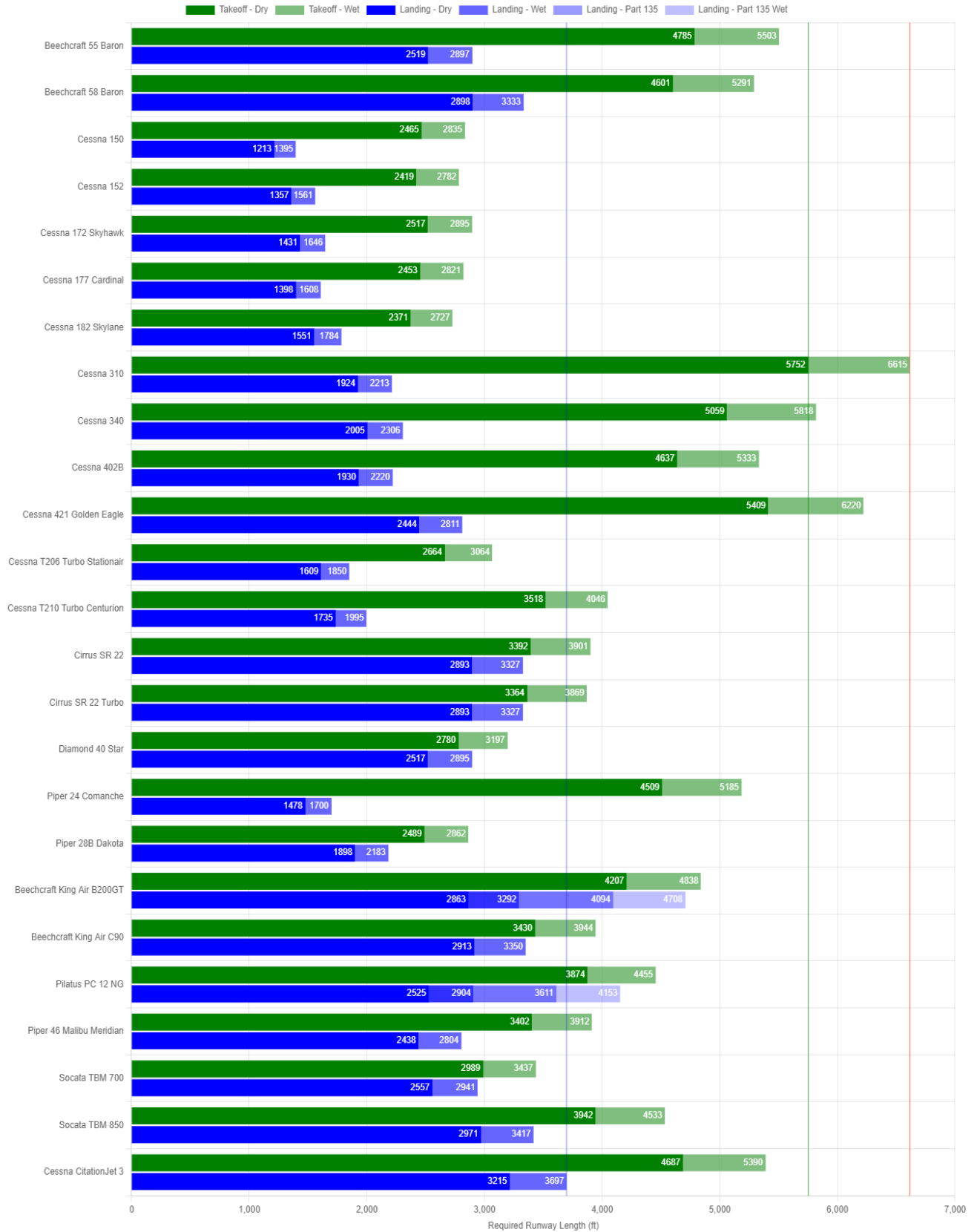
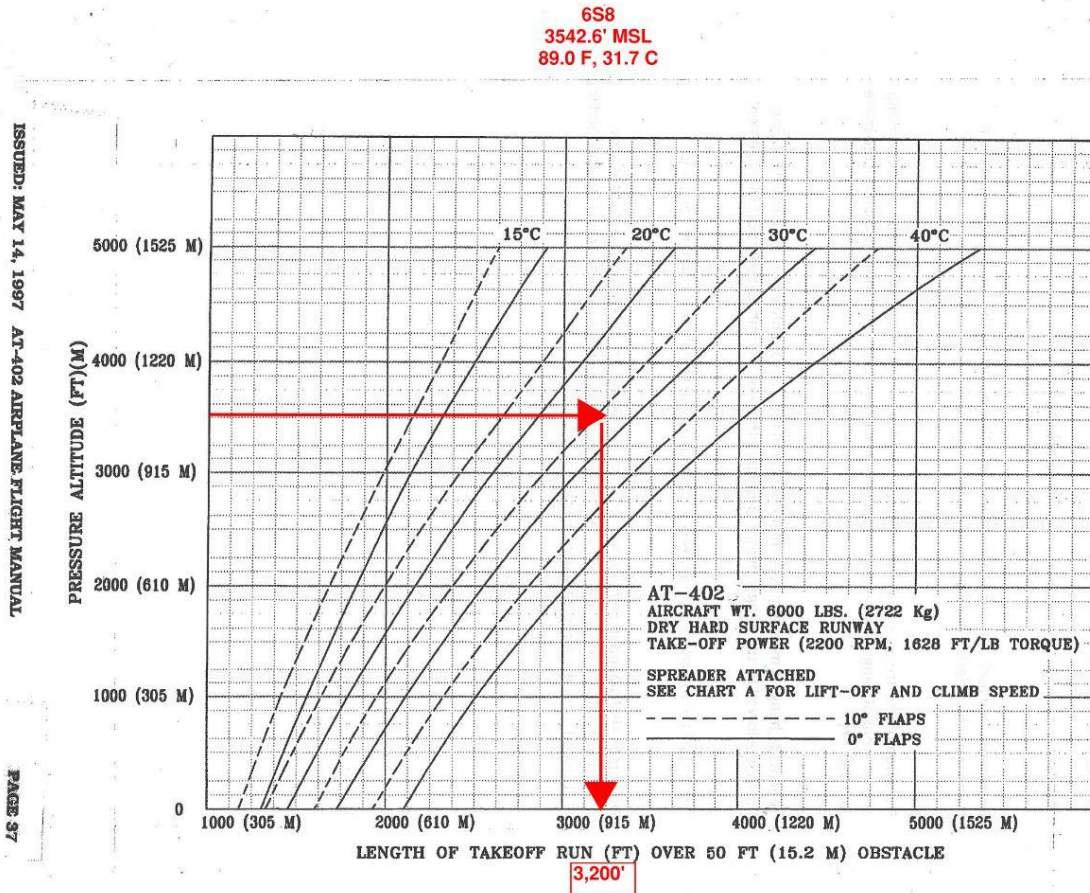


Figure D-2 – Air Tractor 402 Takeoff Performance

Laurel Municipal Airport
Temperature: 88.7°F / 31.5°C - Airport Elevation: 3,543' MSL



Recommended Runway Length: 3,200 feet