

**ACRP Problem Statement 17-07-02****Recommended Allocation: \$300,000**

*Update Runway Length Calculation Charts for General Aviation Aircraft Greater than 12,500 lbs. MTOW and Light Jets*

**ACRP Staff Comments**

The proposed research described in this problem statement and in 17-07-04 could be combined. 17-07-04 could be the main one, and the research geared toward GA aircraft (in 17-07-02) could be added.

**TRB Aviation Committee Comments**

AIRCRAFT/AIRPORT COMPATIBILITY: AC 150/5325-4 Runway Length Requirements for Airport Design used to have runway length calculation tables for different types of aircraft, but that has been replaced with generic graphs. This ACRP would only address a portion of the fleet; it should be more comprehensive.

**Review Panel Recommendation and Comments**

*Recommended.* This issue needs some attention from either the FAA or ACRP. It would be nice to have this information for decision making. While manufacturers provide this data, a desk reference would be easier to use. Does this qualify as research or would it simply be a compilation of existing data? A series of calculations could be useful. Is this mining data and putting into one reference, or will it be calculating the information? Is this a design standard from the FAA, based on the new FAA AC 150/5325-4C (currently in draft form)? It is not clear if the proposed research would produce a calculator or a database. If the latter, who would maintain the database? If all required parameters are incorporated to make the judgement, it could be a useful project; however, if it is just a compilation of data, then not recommended. This is all dependent on what will be included in the new FAA AC 150/5325-4C (currently in draft form). The proposed budget is too high--recommend \$300,000.

**AOC Disposition**

This problem statement received an average rating of 2.0 points out of a possible 5 points among voting AOC members. There was no discussion. No funds were allocated.

## Airport Cooperative Research Program Problem Statement

### PROBLEM STATEMENT TITLE

Update Runway Length Calculation Charts for General Aviation Aircraft greater than 12,500 lbs. MTOW and Light Jets

### BACKGROUND

Runway lengths are calculated based on guidance in Advisory Circular 150/5325-4B provided by the FAA. A draft replacement, AC 150/5325-4C, was distributed in July 2013 which proposed a substantial change in how the runway length would be calculated for general aviation aircraft greater than 12,500 lbs. MTOW and light jets. The change eliminated two charts and required the use of individual aircraft performance charts for this group of aircraft affecting as many as 2,900 non-primary general aviation airports in the NPIAS. The following are the details of the issue.

### **Existing Advisory Circular**

The FAA uses Advisory Circular 150/5325-4B “Runway Length Requirements for Airport Design” as guidance to establish the length of existing and proposed runways based on critical design aircraft. This 4B AC provides tools for determining runway length for all general aviation aircraft using two sets of charts:

- Aircraft 12,500 lbs. MTOW and Less
  - Fig. 2-1 Small Airplanes with Fewer than 10 Passenger Seats (95% and 100% of Fleet)
  - Fig. 2-2 Small Airplanes Having 10 or More Passenger Seats
- Aircraft Greater than 12,500 lbs. MTOW up to and including 60,000 lbs. MTOW
  - Fig. 3-1 75 Percent of Fleet at 60 or 90 Percent Useful Load
  - Fig. 3-2 100 Percent of Fleet at 60 or 90 Percent Useful Load
  - Table 3-1 Airplanes that Make Up 75 Percent of the Fleet
  - Table 3-2 Remaining 25 Percent of Airplanes that Make up 100 Percent of the Fleet

For aircraft, greater than 60,000 lbs. MTOW, the 4B AC requires use of the aircraft manufacturers Airport Planning Manuals (APM). The APMs are readily available for these aircraft typically used by airlines. There are charts in the APM for each derivative of aircraft including engine options. With the given inputs of field elevation, runway gradient and mean maximum temperature, a planning consultant uses the APM for each aircraft with standard passenger/cargo/fuel payloads and the finite list of destinations to determine the runway length required for each specific aircraft to each specific destination. This results in a chart showing aircraft types, destinations and the corresponding required runway length.

### **Draft Advisory Circular**

The FAA provided a draft change AC 150/5325-4C “Runway Length Recommendations for Airport Design” on 7/30/2013. This draft 4C AC provides tools for only small general aviation aircraft and does not include Figures 3-1 and 3-2 from the previous AC.

For all aircraft greater than 12,500 lbs. MTOW and light jets, the 4C AC requires the use of the aircraft performance charts provided by the manufacturers in either APMs or Pilot Operating Handbooks. *While the 4C AC is still draft and not required, there have been instances where certain FAA ADO’s have dismissed the findings of the 4B AC Figs. 3-1 and 3-2 at 90% useful load stating that the draft 4C AC requires analysis of each specific aircraft performance.*

As noted previously, the APMs are readily available for airliners but the aircraft performance charts for each model of general aviation aircraft along with all model derivatives are much more difficult to obtain. Some manufacturers have specifically refused to provide these charts since they are not required to do so. Even if the charts are available, in order to use these charts for general aviation aircraft, it requires a substantial amount of data collection for each airport master plan project. The calculations will require knowing aircraft make/model including engines and modifications, payloads and trip stage lengths.

The consulting time and FAA resources it will take for each airport master plan update (for the 2,900 non-primary airports in the NPIAS) will be significant for the runway length task element. The requirement to use the draft 4C AC will result in a substantial amount of AIP resources annually wasted to reproduce calculation after calculation of what should reside in a set of standard runway length calculation charts available to all airport industry practitioners.

### **5,000 foot minimum length**

Another issue not noted above that arises often with runway length for jet aircraft is the ‘insurance/industry’ requirement for a minimum length of 5,000’. This may have been true many years ago, but should be readdressed at the same time to affirm or correct this minimum length assumption that has existed for decades.

### **OBJECTIVE**

Provide guidance and tools to help airport industry practitioners calculate runway lengths for general aviation aircraft greater than 12,500 lbs. MTOW and light jets.

In carrying out this project, it will be important to closely involve NBAA, GAMA, Insurance companies and even fractional aircraft operators who can each provide their input.

### **PROPOSED TASKS**

- Determine the aircraft make/models to include in the charts based on the frequency of activity in the national airspace system.
- Determine the destination ranges and payloads which should be used.
- Collect the aircraft performance charts for all aircraft make/models to be used to create the runway length requirement charts.
- Create the new chart(s) and/or develop a computer program to determine runway length requirements.

ESTIMATED FUNDING

\$500,000

ESTIMATED RESEARCH DURATION

18 months

RELATED RESEARCH

Advisory Circular 150/5325-4B is the current FAA guidance and there are no other known resources.

PROCESS USED TO DEVELOP THE PROBLEM STATEMENT

There have been numerous discussions among airport planning consultants including comments by ACC related to the draft AC. The development of the problem statement was coordinated with NBAA, GAMA and NASAO.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

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