U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Critical Aircraft and Regular Use Determination

Date: 6/20/2017 **AC No:** 150/5000-17

Initiated By: APP-400

1 Purpose.

- This advisory circular (AC) defines the term Critical Aircraft and provides guidance on the use of Critical Aircraft in facility planning and design studies, and related FAA decision making, for federally obligated airports. Specifically, this AC establishes a common, uniform definition of Critical Aircraft for all deliberations of the FAA Office of Airports, inclusive of planning and environmental, design and engineering, and financial decision making regarding airport development. The Critical Aircraft determination is a key consideration in FAA decision making on project justification. However, this AC does not establish project justification for Federal Airport Improvement Program (AIP) funding. Refer to FAA Order 5100.38, *Airport Improvement Program Handbook,* for specifics on justifying a project for AIP funding.
- This guidance also clarifies when the Critical Aircraft determination includes civilian-owned aircraft under military or other government agency contracts and when a Critical Aircraft determination may include military aircraft activity.
- The term "Regular Use" is also defined and replaces the term "Substantial Use."

2 Application.

- There are multiple published definitions of Critical Aircraft or substantial use in existing FAA Orders and Advisory Circulars (ACs), as shown in the below table. The policy of the Office of Airports is to use this synthesized definition of Critical Aircraft, as contained in this AC, in place of all previous definitions of Critical Aircraft or substantial use found in the documents listed below. The Office of Airports plans to update these documents to reflect the new definition of Critical Aircraft.
- The application of the Critical Aircraft determination to Engineered Material Arresting Systems (EMAS) is unchanged from AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*.

ACs/Order with Superseded Critical Aircraft Definitions

FAA Document	Relevant Section
FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*	Paragraph 3-4
AC 150/5070-6B, *Airport Master Plans*	Appendix A
AC 150/3500-13A, *Airport Design*	Paragraph 102.ff
AC 150/5325-4B, *Runway Length Requirements for Airport Design*	Paragraph 102.a(2) and a(8)

3 Terminology in this AC.

- The terms Critical Aircraft, Design Aircraft, and Critical Design Aircraft are synonymous.
- While the term "substantial use" was used in previous definitions of Critical Aircraft, "regular use" is now used in this AC. Regular use is more representative of what this definition is intending to capture: i.e., planning and development requirements for recurring and future activity at the airport. Airport planning and design requires considering the specific safety and operational needs of all the aircraft that use the airfield. Accordingly, both itinerant and local operations (excluding touch-and-go operations) count towards regular use.

4 Structure of this AC.

This AC is composed of three major sections, with additional resources in the appendices. Critical Aircraft is defined in Chapter 1. Chapter 2 addresses the determination of the existing and future critical aircraft. Chapter 3 provides guidance on the application of the Critical Aircraft determination. A decision tool and examples are provided in the appendices.

5 Feedback on this AC.

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this document.

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CHAPTER 1. CRITICAL AIRCRAFT DEFINITION

1.1 What is the Purpose for Making Critical Aircraft determinations?

The Critical Aircraft determination is an important aspect of airport planning and design for federally-obligated airports. It sets dimensional requirements on an airport, such as the separation distance between taxiways and runways, and the size of certain areas protecting the safety of aircraft operations and passengers. An accurate Critical Aircraft determination helps to ensure the proper development of airport facilities and appropriate federal investments in airport facilities. An accurate Critical Aircraft determination matches aircraft operational area dimensions to the most demanding aircraft that regularly use the runways, taxiways, and apron areas.

1.2 What is the Definition of Critical Aircraft and Regular Use?

1.2.1 The critical aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing.

1.2.2 Chapter 3 describes the application of the Critical Aircraft to various design elements of the airport. For example, a separate Critical Aircraft determination is required for each runway.

1.3 What is the Definition of Similar Characteristics?

For the purpose of identifying a Critical Aircraft, "similar characteristics" refers to the practice of grouping aircraft by comparable operational performance and/or physical dimensions. This is to recognize that it is sometimes necessary for airfield planning and development to group aircraft with similar characteristics together instead of requiring a single aircraft type to exceed the regular use threshold alone. For example, aircraft with similar wingspans and/or approach speeds may be grouped to determine the most demanding Aircraft Approach Category (AAC) and/or Airplane Design Group (ADG), respectively. Aircraft with similar runway length requirements can be grouped to determine the future runway length at an airport. Planners should total the operations of aircraft with similar characteristics when making the Critical Aircraft determination. Throughout this AC, the term Critical Aircraft is inclusive of the similar characteristics definition, as applicable.

1.4 What is the Distinction between the Existing versus Future Critical Aircraft Determinations?

Determining (1) an existing Critical Aircraft and (2) a future Critical Aircraft are required during the planning process, as described in Paragraph 2.6. The existing Critical Aircraft determination is based on current aeronautical use, as described in Paragraph 2.2. The future Critical Aircraft is determined with an FAA-approved forecast that considers aircraft "highly likely" or "expected" to regularly use the airport, as described in Paragraph 2.3. The future Critical Aircraft will often be different than

the existing Critical Aircraft, given operational growth, the retirement of older aircraft types, and the introduction of new aircraft into service. At airports with a stable fleet mix and/or operations, one aircraft type (or grouping with similar characteristics) could be both the existing and future Critical Aircraft. The distinction between existing and a future Critical Aircraft is important, since the timeframe for when an aircraft could regularly use the airport is relevant to planning, funding, and implementation.

CHAPTER 2. DETERMINING THE EXISTING AND FUTURE CRITICAL AIRCRAFT

2.1 What Factors are Involved in the Critical Aircraft Determination?

2.1.1 The existing Critical Aircraft determination requires documenting regular use of airport facilities. Aircraft operations must be counted with enough detail to determine the most demanding aircraft or grouping of aircraft with similar characteristics that regularly use the airport. To accomplish this, an operations count by aircraft make and model is required for the most recent 12-month period of activity that is available.

2.1.2 Documenting aeronautical activity may reflect specific seasonal operational characteristics of an airport (i.e., seasonal scheduled passenger service). Therefore, operations do not need to occur uniformly throughout a 12-month period. However, if the threshold of regular use, in full or in part, is based on an annual or sporadic event (e.g., an airshow), coordination with the FAA's Airports Financial Assistance (APP-500) and Airport Planning and Environmental Division (APP-400) is necessary.

2.1.3 While longer periods of data can be used to assess trends at an airport, the most recent 12-month period of activity that is available should be used to determine existing regular use unless there are extenuating circumstances. Breaks from prior trends must be assessed objectively, as they could be temporary or reflect the emergence of a new long-term operational trend.

2.1.4 Factors to consider when documenting aeronautical activity are more fully explained in the paragraphs below. A periodic review of the existing Critical Aircraft determination is necessary as activity can change at an airport. A revision to the Critical Aircraft determination can be initiated by the airport sponsor. Office of Airports (ARP) Airport District Offices (ADO), Regional Offices, or Headquarters may also require review or revision of the Critical Aircraft determination when needed to support:

- Issuance of an AIP Grant or Passenger Facility Charge (PFC) decision;
- Initiation of a master plan, master plan update, or similar infrastructure planning efforts;
- New or updated Airport Layout Plan (ALP), except for minor revisions (e.g., as-built updates and minor "pen and ink" changes).

2.2 What Data Sources Can Be Used to Document an Existing Critical Aircraft Determination?

Documenting aeronautical activity, including the number of operations by aircraft, is the basis for making an existing Critical Aircraft determination. Sources for documenting aeronautical activity include:

- Aircraft landing fee reports (showing aircraft make and model) as provided by the airport sponsor.
- Completed Instrument Flight Rules (IFR) flight plan data, as made available through the FAA Traffic Flow Management System Counts (TFMSC) database. Historical data is available from the FAA's Aviation System Performance Metrics web site.

FAA National Offload Program data also can be used to document aeronautical use. FAA staff can also access the Performance Based Navigation (PBN) Dashboard for IFR traffic counts by aircraft type.[1] IFR flight count and aircraft type data databases are usually available for any airport with IFR flights, even if there is no air traffic control tower. IFR counts of jet and turboprop operations, once normalized, are considered representative of the total operations of these aircraft types which nearly always operate on IFR flight plans.[2] This is useful for critical aircraft determinations, since jets and turboprops can often be the most demanding aircraft types operating at a general aviation airport. The IFR counts of piston aircraft will often be missing substantial operations, since these aircraft types often operate under Visual Flight Rules (VFR) rules and so are not counted by automated FAA systems.

- Data from an airport or commercially operated flight tracking system.
- Reliable aircraft logs (such as fuel sales records) kept by the airport sponsor, aircraft operators, or fixed base operators (FBO). To be useful, these logs would need to record the aircraft make and model. Alternatively, the logs could record the aircraft registration number, which can be cross-referenced with the FAA aircraft registry database to determine aircraft make and model.
- Observed activity (either in-person or via recorded media) that logs aircraft make and model. Observed activity can be annualized using a valid statistical sampling methodology (e.g., two weeks of observations in each of the four seasons), as outlined in FAA Report FAA-APO-85-7, *Statistical Sampling of Aircraft Operations at Non-Towered Airports*.[3] Acoustical activity counters can be used if attached to visual systems that also capture aircraft registration numbers, in order to provide sufficient information on aircraft make and model.
- Aircraft operator (e.g., airline or charter operator) letters, or written survey results, that document existing levels of use by aircraft type.
- System plan studies, if operations by aircraft make and model are documented. Alternatively, the studies could document the aircraft registration number from which to determine aircraft make and model.

2.3 How is a Future Critical Aircraft Determination Made?

2.3.1 The determination of a future Critical Aircraft is based on an FAA approval of the airport sponsor's forecast. The forecast, as submitted to FAA by the airport sponsor, must include a projection of the number of annual operations by the future Critical Aircraft for the planning horizon year (i.e., typically not more than 20 years from the

[1] PBN Dashboard is available only to FAA, with a username and password required; access to this system is not available to external users.
[2] To normalize the jet and turboprop IFR count data, use the higher of the arrival or departure count by aircraft type and multiply by two. This accounts for IFR flights that are not included in the count, due to IFR flight plan cancellation to fly a VFR approach, or for aircraft that depart VFR and file a flight plan once airborne.
[3] See also ACRP Report 129, Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports, 2015.

base year). Proper diligence and awareness of aircraft fleet trends is needed when establishing the future Critical Aircraft, particularly in cases where the future Runway Design Code (RDC) may change due to an aircraft type with greater requirements (i.e. runway or airfield geometry). Caution is warranted when a change in the critical aircraft is identified in the long-term forecast (years 11-20) given the uncertainty inherent to this forecast range. The long-term change to the critical aircraft must be supported by a reasonable forecast.

2.3.2 Airport sponsors and ARP must consider aircraft operators' plans to retire aircraft and replace them with new types. The Future Critical Aircraft determination must consider ongoing trends in the aircraft fleet. This applies to both general aviation (particularly business aviation) and airline operations. For example, current trends include the gradual retirement of 50-seat regional jets and 4-engine long-haul widebodies, and replacement with more efficient airframes.

2.3.3 The discussion in this AC is about designating a Critical Aircraft for planning purposes. This is distinct from the requirements for project justification for AIP funds. Refer to FAA Order 5100.38, *Airport Improvement Program Handbook*, for specifics on justification and the AIP allowability of projects based solely on a future Critical Aircraft. Project justification is based on existing activity at the airport or activity that is projected to be at the airport within the next five years. If there is concern about the forecast projection actualizing, ARP can require the sponsor to submit letters of support from airport users if the justification is based on projected activity. As stated in Paragraph 2.1, the future Critical Aircraft determination is subject to reevaluation when deemed necessary by ARP to support the issuance of an AIP grant or PFC decision.

2.4 Can Military Aircraft or Other Federal Agency Aircraft Be Included in Documenting Aeronautical Activity to Establish Regular Use?

2.4.1 Yes. Prudent facility planning should include consideration of the requirements of military aircraft or other federally-owned aircraft operating at the airport. However, this determination is made for airport planning purposes only. Federal law does not allow FAA to fund projects that solely benefit another federal agency. Therefore, in some cases, the FAA will need to designate a Critical Aircraft for AIP or PFC eligibility that is separate and distinct from the Critical Aircraft used in planning the airfield.

2.4.2 When an airport sponsor anticipates requesting AIP grant funds or PFC revenues for airport projects, a Critical Aircraft determination (used to determine project eligibility or justification) must consider civil aircraft (and state/local government) activity only. All military and federal government-owned aircraft operations must be excluded. When calculating the amount of funding that can be considered for AIP or PFC projects, the difference in design requirements (if the project is to be built for both civil and military/federal aircraft needs) will be considered and the costs will be prorated accordingly. Refer to FAA Order 5100.38, *Airport Improvement Program Handbook,* for instructions on prorating project costs.

2.4.3 The airport sponsor should document the information identified in Paragraph 2.4.2 in:

1. a Master Plan or ALP narrative report,

2. the sponsor's Capital Improvement Program (CIP) showing prorated project costs for AIP vs. non-AIP eligible portions of a project, or

3. in the narrative of a grant application.

2.5 Can Civil Aircraft Operated Under a Federal Contract Be Included in Documenting Aeronautical Activity to Establish Regular Use?

Yes, if these types of flights are operated under applicable FAA regulations in 14 CFR Parts 91, 121, or 135. Aircraft operated by civil operators under military or other federal government agency contracts as civil operations are counted as civil aircraft activity for the purposes of documenting aeronautical activity, and for AIP or PFC funded projects. This includes civil aircraft operating under contract with the U.S. Forest Service for aerial firefighting activities or unscheduled military aircraft charter flights.

2.6 Does the FAA's Office of Airports Approve the Critical Aircraft Determination(s)?

2.6.1 Yes. ARP (typically the ADO) will approve both the existing and future Critical Aircraft determination for an airport, as submitted by the airport sponsor. During the planning process, this is normally done during the FAA's review of the forecast and documented in the forecast approval letter.

2.6.2 Alternatively, it can be done during the ALP approval narrative report review, if further analysis is needed during the planning process to fully identify the Critical Aircraft. An example of this is with runway length determinations, since it may not be known until the facility requirements are complete what aircraft types (with regular use) are the most demanding of runway length. The critical aircraft determination would then be documented in the ALP approval letter.

2.6.3 When the similar characteristics provision is used to determine the critical aircraft, FAA staff should carefully consider the resulting grouping to ensure that it is an objective, reasonable, and justifiable representation of the most demanding aircraft(s) using or expected to use the airport's relevant facilities.

2.6.4 As stated in Paragraph 2.1, the Critical Aircraft determination is subject to reevaluation when ARP deems it necessary to support the issuance of an AIP grant or PFC decision.

CHAPTER 3. APPLICATION OF CRITICAL AIRCRAFT DETERMINATION

The following are representations of how to apply the critical aircraft determinations to various planning issues when developing an ALP.

3.1 Can Different Aircraft Represent the Critical Aircraft for Separate Elements of Airport Design?

3.1.1 Yes. Different aircraft may define separate elements of airport design. Therefore, effective planning of an airport may need to consider different and multiple Critical Aircraft as listed below:

- Critical Aircraft or grouping of aircraft in the most demanding Aircraft Approach Category (approach speed), expressed as Aircraft Approach Category (AAC) A, B, etc.
- Critical Aircraft or grouping of aircraft in the most demanding Airplane Design Group (ADG) [wingspan], expressed as ADG I, II, etc.
- 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), expressed as TDG 1, 2, etc.
- Critical Aircraft for Engineered Material Arresting Systems (EMAS).

3.1.2 As a result, a single ALP may be based on multiple critical aircraft determinations. Refer to AC 150/5300-13, *Airport Design*, for a definition of RDC, AAC, TDG, and ADG.

3.2 How is the Critical Aircraft Determination applied to Runway Length?

3.2.1 Evaluate each runway separately at an airport. Choose the single aircraft, or grouping of aircraft with similar operational requirements, that have the longest runway length requirement that makes regular use of the runway. In some cases, the Critical Aircraft for runway length may be different from the Critical Aircraft that establishes the most demanding RDC for the runway.

3.2.2 Refer to FAA AC 150/5325-4, *Runway Length Requirements*, for calculating recommended runway length by aircraft types. For aircraft with a Maximum Certificated Takeoff Weight of more than 12,500 pounds, regular use of longer range stage lengths may be relevant to determining the runway length requirement. There are no FAA-established runway length standards for a specific RDC. The runway length requirement at an airport is driven by the needs of the critical aircraft, but the actual length constructed can be adjusted due to physical or environmental constraints.

3.3 Should a Separate Critical Aircraft Determination Be Made for Each Runway at an Airport?

3.3.1 Yes. Designate the most demanding Critical Aircraft for runway length, ADG, AAC, TDG, and RDC for each runway and related taxiways at an airport based upon documented aeronautical activity. Record this information in the runway data block on the ALP. For example, a parallel runway with regular use achieved only by small aircraft would have a different Critical Aircraft determination than a primary runway used by larger business jet aircraft.

3.3.2 The determination of the Critical Aircraft for a crosswind runway requires meeting both the wind coverage requirements as specified in AC 150/5300-13, *Airport Design*, and the regular use requirements for the aircraft that would use the crosswind runway. See Paragraph 3.8.

3.4 Should All Airport Facilities Be Designed to Meet the Needs of the Critical Aircraft?

Not necessarily. Cost effective airport capital improvements are designed for the specific aircraft that use a particular portion of the airport. Therefore, it is appropriate for separate airside elements to have different Critical Aircraft determinations. Design taxiways/taxilanes and facility separations for the most demanding Airplane Design Group (ADG) using that particular area. An example is a T-hangar area that is intended to only serve small aircraft with wingspans less than 49 feet. Design taxilanes in this area only for the small aircraft intended to use the T-hangar facilities. Record this information in the ALP Narrative Report or Master Plan.

3.5 Can the Largest Based Aircraft at a General Aviation Airport Be Used as the Existing Critical Aircraft?

This is appropriate only if that based aircraft meets the requirements of Paragraph 1.2.1. The existing Critical Aircraft determination is a reflection of the actual levels of activity at an airport. Therefore, the Critical Aircraft determination cannot be applied to any aircraft or grouping of aircraft that does not regularly use the airport (Note: airport sponsors should use basedaircraft.com, and update it as necessary, to identify based aircraft.).

3.6 What if a General Aviation Aircraft Is More Demanding than the Aircraft Used In Scheduled Passenger Service?

Use the general aviation aircraft to define the Critical Aircraft as long as that aircraft meets the requirements of Paragraph 1.2.1.

3.7 What is the Correct Critical Aircraft Determination When General Aviation Aircraft and Scheduled Passenger Service Aircraft Use the Same Runway?

The Critical Aircraft is determined by selecting the aircraft type using the runway that meets the requirements of Paragraph 1.2.1, regardless of whether the aircraft is used for general aviation or scheduled passenger service (or both).

3.8 How Should a Critical Aircraft Determination Be Made for a Crosswind or Secondary Runway at an Airport?

Carefully consider the Critical Aircraft determination for secondary use runways (i.e., crosswind runways, parallel runways) at an airport. Use Appendix A as a guide when making the Critical Aircraft determination for a crosswind or secondary runway at an airport, particularly when evaluating use of 14 CFR Part 121/125/135 operations. Primary, crosswind, and secondary runways are defined in FAA Order 5100.38, *Airport Improvement Program Handbook.*

3.8.1 A Critical Aircraft determination for a crosswind runway requires meeting both the wind coverage requirements as specified in AC 150/5300-13A, *Airport Design*, and the regular use requirements for the aircraft that would use the crosswind runway.

3.8.2 The expected use of a crosswind or secondary runway can change in future years. For example, planned instrument flight procedures to a secondary runway may have approach visibility minimums that are better than those available on the primary runway. Or, growth in operational demand or the development of new terminal facilities that are proximate to a secondary runway could result in increasing use of that runway by more demanding aircraft. If there is an analytical planning basis and reasonable expectation that supports use of a more demanding aircraft with operations that exceed the regular use threshold, then that aircraft should be designated as the Future Critical Aircraft.

3.9 Should a Critical Aircraft Determination Be Made for Pavement Strength Design?

No. The methodology for designing pavements is different. Refer to AC 150/5320-6, *Airport Pavement Design and Evaluation*. FAA pavement design considers the damage to the pavement from each individual aircraft in the traffic mixture. The final pavement thickness is based upon the cumulative damage of all aircraft.

3.10 How is the Critical Aircraft Determination applied to EMAS?

AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns,* provides guidance of the critical aircraft for EMAS beds. For EMAS, the critical aircraft is defined as that aircraft (using the associated runway) that imposes the greatest demand upon the stopping ability of the EMAS. This is usually, though not always, the heaviest/largest aircraft that regularly uses the runway. EMAS performance is dependent not only on aircraft weight, but landing gear configuration and tire pressure. In addition to the critical aircraft, the current and future fleet mix using the runway is considered in the EMAS design to assess the capability to stop aircraft at a minimum of 70 knots (standard) or a minimum of 40 knots (non-standard).

3.11 What Should Be Done if a Scheduled Revenue Aircraft (Passenger or Cargo) Exceeds the Design Standards of an Airport, but Does Not Meet the Threshold of Regular Use?

3.11.1 Because the airport sponsor has responsibilities for airport safety, they should work cooperatively with the FAA to determine potential measures to mitigate any risk to the

air transportation system for scheduled revenue flights. An example is an aircraft that falls within RDC D-V using an airport that meets RDC C-III standards. In this case, a Modification of Standards under FAA Order 5300.1, *Modifications to Agency Airport Design, Construction, and Equipment Standards* and operational procedures must be used to ensure the continued safe operation of aircraft in a nonstandard airfield, in the interest of protecting users, aircraft operators, and airport owners. However, the airport sponsor cannot restrict airport access based on design standards without an FAA determination (from ARP and the Flight Standards Service [AFS]).

3.11.2 The ADO will coordinate with the ARP's Airport Engineering Division (AAS-100) for assistance in examining potential operational risk mitigation strategies when:

- A 14 Code of Federal Regulations (CFR) Part 121 or 14 CFR Part 129 certificated air carrier operates on a published schedule, and reports scheduled commercial activity to the U.S. Department of Transportation; or

- When a 14 CFR Part 135 Air Taxi operator conducts scheduled operations to the airport, regardless of the number of total operations.

3.11.3 Although the scheduled revenue aircraft does not have sufficient operations to meet regular use, both the airport and the pilot in command are responsible for safe operations.

3.12 What Should Be Done if an Aircraft Operating under the General Operating and Flight Rules, or an Unscheduled Revenue Aircraft, Exceeds the Design Standards of an Airport but Does Not Meet the Threshold of Regular Use?

3.12.1 Because the airport sponsor has responsibilities for airport safety, operational mitigations such as limitations to taxiing or other operating procedures should be used to ensure safe operations for aircraft operating under 14 CFR Part 91, or unscheduled revenue aircraft (passenger or cargo) under 14 CFR Part 135. However, the airport sponsor cannot restrict airport access based on design standards without an FAA determination from ARP and AFS.

3.12.2 In addition, pilots are responsible for the safe operation of their aircraft and must be familiar with all available information which affects their flight, in accordance with 14 CFR 91.103.

3.13 What Should Be Done if the Existing Critical Aircraft Exceeds the Existing Airport Standards at a Geometrically Constrained Facility?

3.13.1 An example of this situation is when the runway-to-taxiway separation distance is insufficient per airport design standards.

3.13.2 Because the airport sponsor has responsibilities for airport safety, they should work cooperatively with the FAA through a planning study to evaluate geometric changes to mitigate risk. If geometric changes are not feasible, then Modifications to Standards and operational procedures are needed to ensure safe operations. The airport sponsor

cannot restrict airport access based on design standards without an FAA determination from ARP and AFS.

3.13.3 Once the Critical Aircraft has been identified in accordance with this AC, and the resulting RDC established, then this should be reflected on the ALP as the Critical Aircraft regardless of whether the airport meets that standard and regardless of whether the sponsor plans to reconfigure the airport to meet the standard. The existing Approach and Departure Reference Code (APRC and DPRC) are also identified on the ALP.

3.14 How Should Variants of the Same Aircraft Model Be Counted?

3.14.1 An example of this is a Boeing 737-800 with winglets, versus the same type without winglets.

3.14.2 Determining which variant of aircraft is actually using an airport can be difficult, as the variances of an aircraft model are typically not reported on landing fee reports or in other data sources. Therefore, an acceptable practice is to plan for the least performing/most demanding variant of a particular aircraft model. However, if detailed data is readily available, or if the operator of the Critical Aircraft uses only one variant of an aircraft type, then the more specific information may be used. When the existing critical or future critical aircraft is projected to be operated by an identifiable or group of identifiable Part 121/129/135 air carriers, such detailed data should be considered when readily available. Similarly, if an operator is in the process of upgrading its entire fleet (e.g., if all Boeing 737-800s are to receive the same winglets), this specific information should also be used.

3.15 Can an Airport Sponsor Pursue Development of Facilities in Excess of the Design Standards Needed by the Critical Aircraft?

3.15.1 Yes, but AIP grant funding will typically be limited to that portion of the project that meets FAA standards. FAA will not participate with AIP funds in the portion of the project that exceeds FAA standards. For example, an airport sponsor could develop a B-II primary runway to the standards needed by occasional use of a C-III aircraft, even if it has insufficient operations for regular use. Or, an airport sponsor may wish to develop a secondary runway to the higher design standards needed for commercial operations (that do not have regular use on the secondary runway) for instances when the primary runway is unavailable during maintenance, rehabilitation, or reconstruction.

3.15.2 FAA policy is the public need has been fully met if the project meets the FAA standards. Therefore, a project that is designed or built to a more rigorous standard is considered to exceed FAA standards. As described in FAA Order 5100.38, *Airport Improvement Program Handbook*, FAA will not provide AIP funds for work exceeding FAA standards, except for the limited exceptions outlined in that Order. The sponsor can pay for the cost to exceed FAA standards if the applicable procurement requirements are met.

3.15.3 At airports where there is a reasonable possibility that a more demanding aircraft (e.g., an AAC-C or -D) will eventually exceed the regular use threshold, the airport sponsor and the FAA should consider if it is prudent to develop a parallel taxiway with larger than standard runway to taxiway separation. This is particularly relevant at airports that are designed for AAC -A or -B critical aircraft, given the substantial increase in standards that occurs with going to the AAC -C or –D environment. Generally, the FAA could determine that the long term benefits of locating the taxiway at a separation that exceeds the current standard will outweigh the potential cost of relocating the taxiway in the future. Refer to FAA Order 5100.38, *Airport Improvement Program Handbook,* regarding funding projects that exceed FAA standards.

3.15.4 In situations when the new Critical Aircraft is less demanding than the previously identified critical aircraft, additional considerations are warranted. The previous Critical Aircraft will usually have been identified on the last approved ALP. The distinction between the previous and new Critical Aircraft is important because it allows for an assessment of current infrastructure versus existing and future needs. Use of the existing airfield elements by the less demanding Critical Aircraft may often be acceptable. For example, a runway to taxiway separation developed for a larger critical aircraft should not normally be reduced for a new, less demanding Critical Aircraft. However, a runway reconstruction project would necessitate assessment of the runway length needs for the new, less demanding critical aircraft. An airport sponsor should consult with the FAA through a planning study to evaluate the operational efficacy of the existing facilities and elements. In some cases, the FAA may find it economical to maintain the existing airfield facility or element as-is.

APPENDIX A. DECISION TOOL FOR DESIGNATING THE CRITICAL AIRCRAFT ON A CROSSWIND OR SECONDARY RUNWAY

Figure A-1. Step 1 of the Decision Tool for Designating the Existing Critical Aircraft

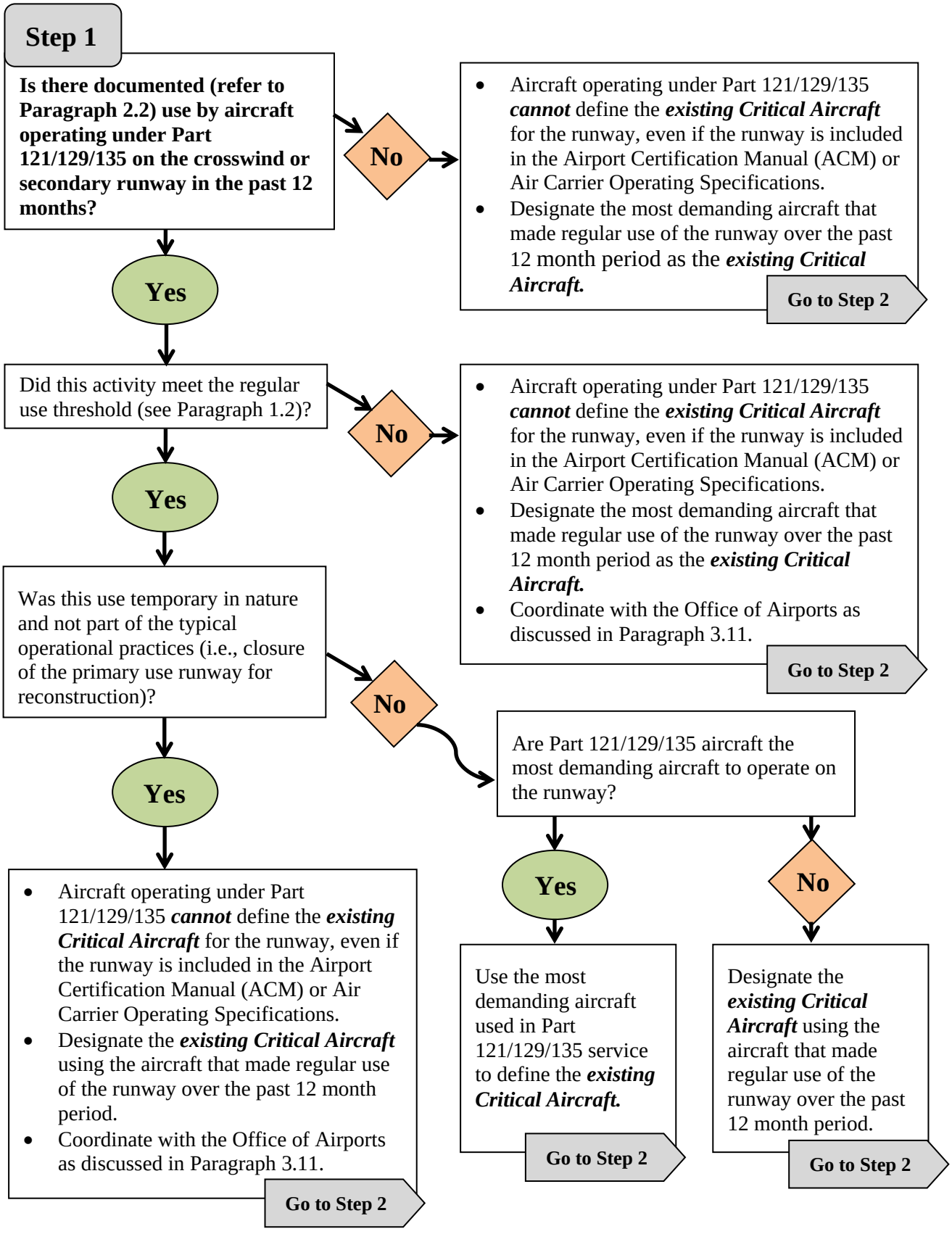
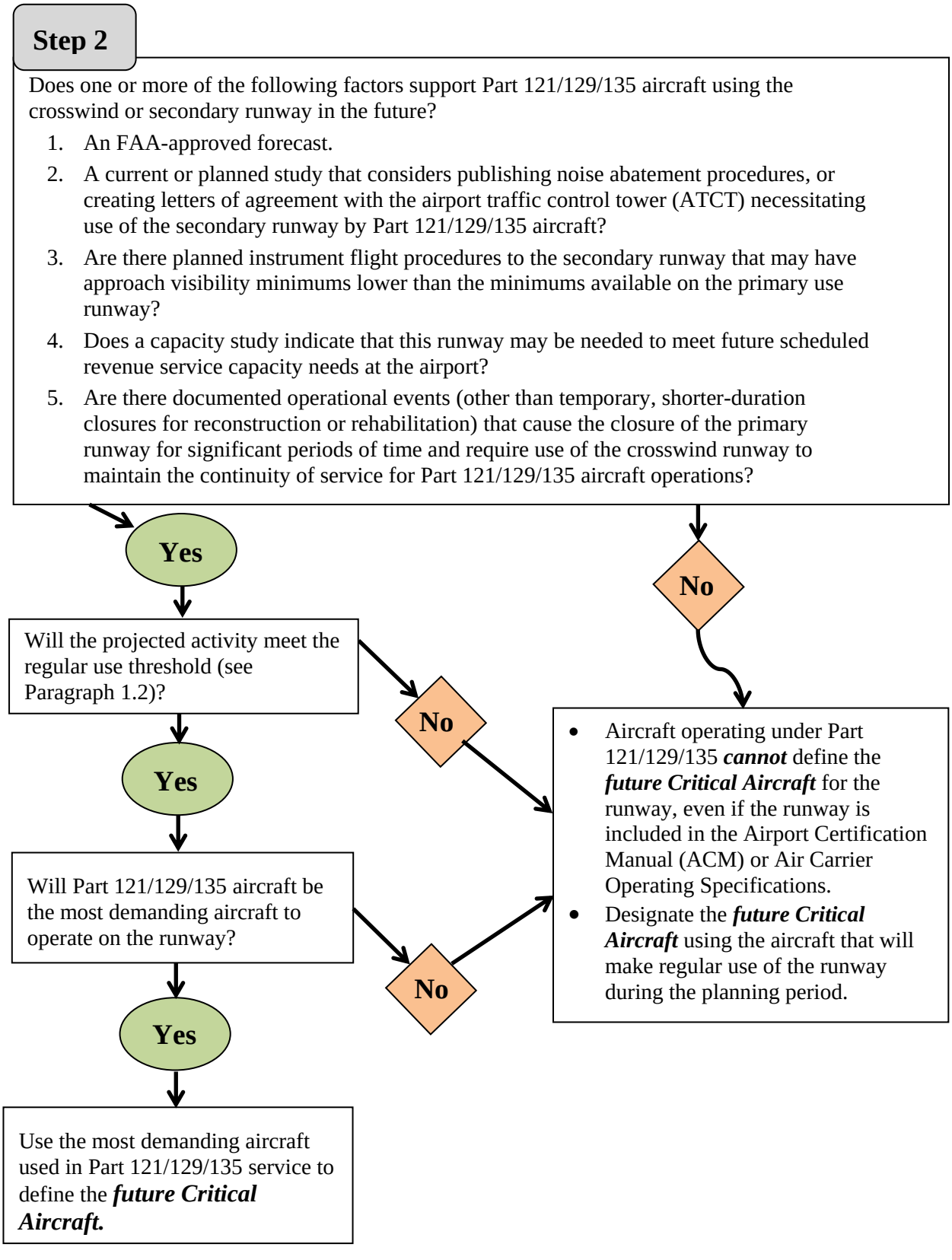


Figure A-2. Step 2 of the Decision Tool for Designating the Future Critical Aircraft



APPENDIX B. EXAMPLES OF CRITICAL AIRCRAFT DETERMINATIONS

B.1 Example 1: General Aviation Critical Aircraft

B.1.1 The Critical Aircraft is a **Cessna CJ3 (B-II)**. The C-II operations are less than the required 500 annual operations.

B.1.2 In situations where there is a reasonable possibility that the more demanding aircraft (e.g., the C-II operations) will eventually exceed the regular use threshold, the airport sponsor and the FAA should consider if it is prudent to develop a parallel taxiway with larger than standard runway to taxiway separation-as a hedge on growth that may be higher than currently forecast. This is particularly relevant at airports that are designed for AAC -A or -B critical aircraft, given the substantial increase in standards that occurs with going to the AAC -C or –D environment. Generally, the FAA could determine that the long term benefits of locating the taxiway at a separation that exceeds the current standard will outweigh the potential cost of relocating the taxiway in the future. Refer to FAA Order 5100.38, *Airport Improvement Program Handbook*, regarding funding projects that exceed FAA standards.

Example 1. Table showing a General Aviation Critical Aircraft

Aircraft	Aircraft Approach Category (AAC) + Airplane Design Group (ADG)	Annual Operations
Embraer E145 (Air Carrier)	C-II	250
Cessna CJ3 (General Aviation)	B-II	1,900

B.2 Example 2: Air Carrier Critical Aircraft

The Critical Aircraft is an **Embraer 145 (C-II)** because it represents the most demanding aircraft with more than 500 operations.

Example 2. Table showing an Air Carrier Critical Aircraft

Aircraft	AAC+ADG	Annual Operations
Cessna CJ3 (General Aviation)	B-II	550
Embraer E145 (Air Carrier)	C-II	1,500

B.3 Example 3: Primary and Secondary Runway Considerations

B.3.1 For the primary runway, the Critical Aircraft is an **A320 (C-III)** because it represents the most demanding aircraft with more than 500 annual operations. Accordingly, the airport should consider upgrades to meet applicable C-III design standards. The runway also provides greater than 95% crosswind coverage for the aircraft type (16 knots for RDC C-III).

B.3.2 For the crosswind runway, the Critical Aircraft is **Cessna CJ3 (B-II)** because it represents the most demanding aircraft with more than 500 operations. In addition, the aircraft needs the runway in order to meet the crosswind coverage requirements (13 knots for RDC B-II) per Paragraph 3.3.

B.3.3 The airport sponsor should coordinate with the FAA as specified in Paragraph 3.11 above due to the scheduled passenger aircraft RDC exceeding the RDC for the primary runway.

Example 3. Table showing Different Critical Aircraft with the Primary and Secondary Runways

Aircraft	**AAC+ADG**	**Annual Operations**
Primary Runway (*This runway meets C-II design standards.)*		
Airbus A320 (Air Carrier)	C-III	1,500
Gulfstream G350 (General Aviation)	C-II	550
Crosswind Runway *(This runway meets B-II design standards.)*		
Airbus A320 (Air Carrier)	C-III	200
Cessna CJ3 (General Aviation)	B-II	5,000

B.4 Example 4: Similar Characteristics #1

The Critical Aircraft is the **B-III** aircraft because it represents the most demanding aircraft with more than 500 operations, using the similar characteristics provision discussed in Paragraph 1.3. In this example, there are more than 500 annual operations of AAC 'B' aircraft (EMB-120 and ATR-72, combined). There are also more than 500 annual operations of the ADG 'III' aircraft (ATR-72 and MD-90, combined). Accordingly, the combined annual operations are sufficient to establish regular use for the B-III aircraft.

Example 4. Table for Using the Similar Characteristics Definition to Determine the Critical Aircraft

Aircraft	AAC+ADG	Annual Operations
Embraer EMB-120	B-II	1000
ATR-72	B-III	350
Boeing MD-90	C-III	200

B.5 Example 5: Similar Characteristics #2

B.5.1 The Critical Aircraft is the **B-III** aircraft because it represents the most demanding aircraft with more than 500 operations, using the similar characteristics provision discussed in Paragraph 1.3.

B.5.2 In this example, there are 450 annual operations of AAC 'B' aircraft (EMB-120 and ATR-72, combined). Because AAC-C is faster than AAC-B, these operations can be added to the AAC-B operations for the purpose of the critical aircraft determination. Accordingly, the airport has at least 500 operations by the AAC-B (or greater) approach category.

B.5.3 There are also more than 500 annual operations of the ADG 'III' aircraft (ATR-72 and MD-90, combined). Accordingly, the combined annual operations are sufficient to establish regular use for the B-III aircraft.

Example 5. Table for Using the Similar Characteristics Definition to Determine the Critical Aircraft

Aircraft	AAC+ADG	Annual Operations
Embraer EMB-120	B-II	100
ATR-72	B-III	350
Boeing MD-90	C-III	200

B.6 Example 6: Critical Aircraft for Runway Length

The operations from the **G550** general aviation aircraft and **A319** air carrier aircraft with runway length requirements of 6,000 feet are combined to meet the 500 annual operations regular use threshold. These aircraft now define the Critical Aircraft for runway length.

Example 6. Table for Considering Runway Length when Determining the Critical Aircraft

Aircraft	Runway Length Requirement *	Annual Operations
Cessna CJ2+ (General Aviation)	4,000’	20,000
Boeing MD-82 (Air Cargo)	7,900’	300
Airbus A319 (Air Carrier)	6,000’	350
Gulfstream G550 (General Aviation)	6,000’	200

* Aircraft runway length performance is notional for this example.

B.7 Example 7: Occasional use of Larger Aircraft Insufficient to be the Critical Aircraft

B.7.1 A commercial service airport receives regularly scheduled service from three different air carriers. The published schedule for the airport shows that two of these air carriers provide regularly scheduled service with an Embraer EMB-120 and Canadair CRJ-200. The third air carrier provides regularly scheduled service with a Boeing 737. Occasionally, the third air carrier replaces the B737 with a B757 on the published schedule during peak periods.

B.7.2 The **B737** is the Critical Aircraft. While the B757 is the more demanding aircraft, it has insufficient use to be the Critical Aircraft. The airport sponsor should coordinate with the FAA, as specified in Paragraph 3.11, if the runway(s) used by the B757 do not meet D-IV standards. FAA coordination will determine the need for a Modification of Standards or operational risk mitigations that ensure continued safe operations of aircraft when operating in a nonstandard airfield, in the interest of protecting users, aircraft operators, and airport owners.

Example 7. Table with 12 Month of by Scheduled Passenger Service

Aircraft	AAC+ADG	12 Month Activity Total
Embraer EMB-120	B-II	3,640
Bombardier CRJ-200	C-II	1,456
Boeing B737	C-III	2,912
Boeing B757	D-IV	208

B.8 Example 8: Critical Aircraft Determination with Diverse Aircraft Fleet Mix

B.8.1 The existing AAC+ADG is expressed as B-I. The future RDC is expressed as B-II.[4] This scenario is based on a single runway general aviation airport.

B.8.2 While the future B-II aircraft only totals 490 operations, the similar characteristics concept allows for the C-II aircraft operations to be included achieving the 500 annual operations needed for regular use. This results from combining the ADG-II operations, which would then exceed 500 annual operations.

B.8.3 Caution is normally warranted if the D-III operations, in this example, were being considered in the critical aircraft determination. Such low volume operations can fluctuate substantially from year-to-year and may not be indicative of sustained operations. In this example, the D-III operations were not considered, since the future RDC determination of B-II was substantiated by the indicated aircraft operations.

Example 8. Table showing a Critical Aircraft Determination with a Diverse Aircraft Fleet Mix

Aircraft Type	AAC+ADG	Existing Annual Operations	FAA Approved Five Year Forecast
Cessna 172	A-I	19,000	21,020
Beechcraft Bonanza	B-I	6,000	6,200
Cessna 501 Citation I/SP	B-I	1,100	1,250
Beechcraft King Air 200	B-II	220	260
Cessna 550 Citation II	B-II	180	230
Cessna 750 Citation X	C-II	90	120
Gulfstream V	D-III	10	20
Total Operations		26,600	29,110
Subtotals by AAC	A	19,000	21,020
	B	7,500	7,940
	C	90	120
	D	10	20
Subtotals by ADG	I	26,100	28,470
	II	490	610
	III	10	20

[4] By definition in AC 150/5300-13A, *Airport Design*, the RDC signifies the design standards to which the runway is to be built.

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by—

- Mailing this form to the FAA Office of Airports, Airport Planning and Environmental Division (APP-400) at FAA, APP-400, Room 615, 800 Independence Ave SW, Washington DC 20591; or
- Calling (202) 267-3263 to request an email address to which you can send it; or
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Subject: AC 150/5000-17 **Date:** _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

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☐ I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____ Date: _____