

Assignment 1: Familiarization with Aviation Data Sources and Aircraft Classifications

Date Due: September 5, 2024

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Problem 1

Download the latest version of the FAA Advisory Circular 150/5300-13B with Change 1 (https://www.faa.gov/documentLibrary/media/Advisory_Circular/draft-150-5300-13B-Airport-Design-chg1-ind-red.pdf.pdf). Read carefully Section 1.6 of the advisory circular before answering the following questions. Also become familiar with Appendix 1 in the same Advisory Circular and download the Aircraft Characteristics Database (see sample below). The FAA Aircraft Characteristics Database can be downloaded at: https://www.faa.gov/airports/engineering/aircraft_char_database.

ICAO_Code	FAA_Designator	Manufacturer	Model_FAA	Model_BADA	Physical_Class
A10	A10	FAIRCHILD	Fairchild A10	Fairchild A-10A	Jet
A124	A124	ANTONOV	Antonov AN-124 Ruslan	Antonov AN-124-100	Jet
A19N	A19N	AIRBUS	Airbus A319 Neo	Airbus A319 Neo	Jet
A20N	A20N	AIRBUS	Airbus A320 Neo	Airbus A320-271N	Jet
A21N	A21N	AIRBUS	Airbus A321 Neo	Airbus A321-251N	Jet
A306	A306	AIRBUS	Airbus A300 B4-600	Airbus A300B4-622	Jet
A30B	A30B	AIRBUS	Airbus A300-B2	Airbus A300B4-203	Jet
A310	A310	AIRBUS	Airbus A310	Airbus A310-204	Jet
A318	A318	AIRBUS	Airbus A318	Airbus A318-112	Jet
A319	A319	AIRBUS	Airbus A319	Airbus A319-131	Jet
A320	A320	AIRBUS	Airbus A320	Airbus A320-231	Jet

Aircraft Characteristics Database.

- Name the two aircraft characteristics used to determine the FAA Aircraft Taxiway Design Group (TDG).
- Name the two characteristics used to determine the ICAO Code 2 airport design group. Contrast those with the FAA ADG airport design criteria. Are the parameters the same?
- A small regional airport has a single 6,500-foot runway. The Embraer 145LR is expected to be the critical aircraft (see Figure 1). Find the ADG, AAC and TDG code for the airport.
- If the airport is located in South America, find the ICAO design codes (codes 1 and 2).



Figure 1. Embraer 145LR Departs Charlotte Douglas Airport. Source: A. Trani.

- e) Find the airport RDC parameters allowing an airline to conduct operations with Boeing MD-11 aircraft (see Figure 2). Assume the visibility minima is 2,400 feet. State the ICAO Aerodrome Reference Code (Element 2) for the Boeing MD-11.



Figure 2. Boeing MD-11 Cargo Aircraft Landing at ATL Airport. Source: A. Trani.

- f) A new airport project identifies the Cessna 560XL (see Figure 3) as the critical aircraft for the future facility. Find the ADG, AAC and taxiway design groups to design the airport.



Figure 3. Cessna Citation 560XL (Excel). Source: A. Trani.

Problem 2

Aircraft Consolidated Wake Classification

- A Boeing 717-200 (ICAO Code is B712) follows an Airbus A300-600 (ICAO Code is A306) that is landing on runway 36R at Charlotte Airport (CLT). Find the minimum separation between the Boeing 717-200 trailing the Airbus A300-600 according to the Consolidated Wake Turbulence Reclassification (see course notes on aircraft classifications starting on pages 53-54 of aircraft classification the class notes). Figure 4 shows both aircraft.
- If the Boeing 717-200 in part (a) travels at 146 knots on final approach, find the time between successful arrivals (in seconds) between the arrival of the A300-600 and the B717-200 to the runway threshold (see example in the notes).
- A new generation of supersonic aircraft is expected to operate in 2035. The Boom Overture (<https://boomsupersonic.com/>) will be able to operate at speeds 1.7 times the speed of sound in cruise (Mach 1.7). Preliminary dimensions for the Overture are shown in Figure 5. Determine the TDG design group for the aircraft.
- If the wingspan of the Boom Overture is expected to be 61 feet, determine the ADG design group.



Figure 4. Airbus A300-600 (top) and Boeing 717-200 (bottom). Source: A. Trani.

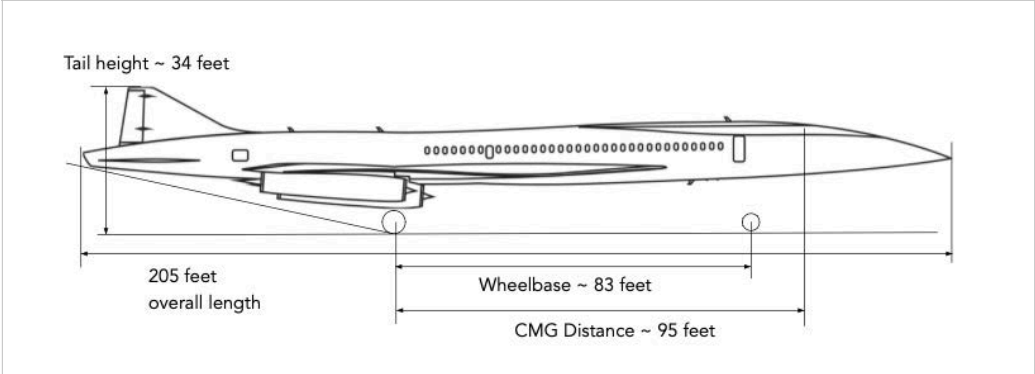






Figure 5. General Dimensions for Boom Overture. The Main Gear Width is estimated to be 28 feet.






Problem 3

Identify the commercial aircraft presented in the Table 1. State the FAA Aircraft Design Group (ADG), Taxiway Design Group (TDG) and Aircraft Approach Class (AAC). Here is a list of possible choices (more choices than pictures to add a little challenge): Cessna Citation Latitude (C68A), Boeing 777-300 (B773), Boeing 737-Max9 (B39M), Boeing 717-200 (B712), Boeing 787-8 (B788), Beechcraft King Air B350, Cessna 182 (C182), Embraer 190 (E190), Airbus A320-200 (A320), and Airbus A321 (A321). Use the FAA Aircraft Characteristics Database to get information on ADG, TDG, AAC.

To help you identify the aircraft use my web site which contains similar pictures with annotations (<https://photos.app.goo.gl/8bdSvdwPQU7IHIDi2>). Other good sites to help identify aircraft are Airliners.net <http://www.airliners.net> and Jet Photos <http://www.jetphotos.net>.

Table 1. Aircraft for Problem 2.

Picture	Aircraft Name	ADG	TDG	AAC
	Airbus A320-200	III	3	C
				
				
				

Picture	Aircraft Name	ADG	TDG	AAC
				
				
				
				
				

Problem 4

True or false section.

Question	True / False
There were more than 10,000 Douglas DC-3 built.	
In 1933, the largest commercial aircraft flying between continents were flying boats.	
The Douglas DC-8-50 required a runway length of ~8,000 feet.	
The British/French Concorde was the fastest commercial aircraft flying in 1975.	
Automated People Movers were introduced at airports in 1965.	
Regional Turboprop aircraft such as the Aerospatiale ATR-72 (AT72) require the same runway length as the Embraer 175 regional jet.	
ADS-technology is used to track aircraft in real-time today.	
Radar technology is still in use today to track aircraft.	
The Boeing 787 Dreamliner offered 15% improved fuel economy over the aircraft it replaced (e.g., Boeing 767-300)	
There are 5000 airports in the US that can receive federal funds.	