BASICS FOR AIR TRAFFIC CONTROL – AIRCRAFT CHARACTERISTICS AND RECOGNITION

MODULE OVERVIEW

Purpose: The purpose of this module is to introduce how different aircraft look, and perform, and the written and visual identifiers of aircraft.

MODULE OUTLINE

Independent Review (Introduction) – Aircraft Recognition Flashcards

Lesson: Identifying Aircraft

Purpose: The purpose of this lesson is to explain how aircraft are categorized by weight and performance characteristics.

Objectives:

- Identify categories of aircraft
- Identify weight classes of aircraft
- Identify performance characteristics of aircraft

Topics:

- Categories
  - CAT I Aircraft
  - CAT II Aircraft
  - CAT III Aircraft
- Restrictions and Limitations
- Weight Classes
- Weight Class Definitions
- Knowledge Check
- Aircraft Performance Characteristics
  - CAT I
  - CAT II
  - CAT III
  - Helicopters
- Knowledge Check
- Review/Summary

Lesson: Aircraft Names and Designators

Purpose: The purpose of this lesson is to define how aircraft designators are derived for civil and military aircraft.

Objective:

- Identify aircraft names
- Identify aircraft designators

Topics:

- Aircraft Designators
  - Civil Designators
  - Military Designators
- Knowledge Check
- Review/Summary

Question and Answer Session – *Parking Lot*

Lesson: Aircraft Identification Features

Purpose: The purpose of this lesson is to learn features controllers can use to identify aircraft.

Objective:

- Identify identification features of aircraft

Topics:

- Aircraft Identification Features
  - Size
  - Engine Location and Numbers
  - Aircraft Engine Types
  - Wing Placement
  - Wing Configuration
  - Tail Configuration
  - Windows
  - Fuselage
  - Landing Gear
- Knowledge Check
- Review/Summary

Question and Answer Session – *Parking Lot*

Independent Review – Aircraft Recognition Flashcards

Activity – Aircraft Recognition Tournament

Question and Answer Session – *Parking Lot*

End-of-Module (EOM) Test

INTRODUCTION

LESSONS	■ Identifying Aircraft ■ Aircraft Names and Designators ■ Aircraft Identification Features
TOTAL ESTIMATED RUN TIME	4 hrs. 44 mins.
MODULE CONTENT	■ Module Overview ■ Independent Review (Introduction) – Aircraft Recognition Flashcards ■ Lesson: Identifying Aircraft ■ Lesson: Aircraft Names and Designators ■ Q&A Session – Parking Lot ■ Lesson: Aircraft Identification Features ■ Q&A Session – Parking Lot ■ Independent Review – Aircraft Recognition Flashcards ■ Activity – Aircraft Recognition Tournament ■ Q&A Session – Parking Lot ■ End-of-Module Test

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to select ***Aircraft Characteristics and Recognition*** module link within Blackboard ■ Instruct students to read the module introduction and then wait quietly for additional instructions	Blackboard
	EST. RUN TIME
	2 mins.

Without the knowledge of aircraft types and characteristics, your job to efficiently control aircraft would be much more difficult!

Not all aircraft are alike, nor are all aircraft created equal. Being able to differentiate between the various aircraft and their characteristics will make it easier for you to determine their limitations. For example, you need to know the answers to questions, such as:

- Can these two aircraft pass on the same taxiway?
- Can this aircraft out-climb that crossing traffic?
- What type of traffic pattern will this aircraft fly?

The purpose of this module is to introduce how different aircraft look and perform, and the written and visual identifiers of aircraft.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Aircraft Recognition Flashcards*** in ***Exercise and Activities*** in Blackboard ■ ***Note:*** The intent of this session is only to introduce students to the activity, they will not conduct the activity at this time ■ Instruct students to navigate to the ***Exercise and Activities*** in Blackboard ■ Instruct students to locate ***Aircraft Recognition Flashcards*** ■ ***Optional:*** Allow students to launch the activity and as a class walk through the first set of flashcards demonstrating the mechanics of the activity ■ Inform students this is a non-graded, self-paced graphic independent review presented in flashcard format, to define characteristics and identification of aircraft ■ Inform students the content presented in the lessons is integrated in the flashcards and should be applied during the review ■ Instruct students to individually review the flashcards during periods of time in which they are waiting for others to complete a lesson ■ Inform students there will also be an assigned block of time to spend reviewing towards the end of the module ■ Inform the students the content in the flashcards will be tested at the end of the module during the Aircraft Recognition Tournament ■ Inform students that opportunities will be afforded throughout the remainder of the course to revisit the flashcards during periods of down time	Independent Review **EST. RUN TIME** 10 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Identifying Aircraft*** and ***Aircraft Names and Designators*** lessons in Blackboard ■ Instruct students to navigate to the ***Identifying Aircraft*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of ***Identifying Aircraft*** instruct students to navigate to the ***Aircraft Names and Designators*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

IDENTIFYING AIRCRAFT

Purpose: The purpose of this lesson is to explain how aircraft are categorized by weight and performance characteristics.

Objectives:

- Identify categories of aircraft
- Identify weight classes of aircraft
- Identify performance characteristics of aircraft

References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control
- FAA Order JO 7360.1, Aircraft Type Designators
- ATG-2, Tri-Option Controller Reference Manual

Categories

Aircraft categories are used to determine same runway separation. They:

- Provide a method of grouping aircraft
- Allow for immediate distinction

Aircraft are divided into three categories:

Category I (CAT I)	 
Category II (CAT II)	
Category III (CAT III)	

Category I Aircraft (CAT I)

- Weight: 12,500 pounds or less
- Single-engine
- Propeller-driven
- All helicopters

Category II Aircraft (CAT II)

- Weight: 12,500 pounds or less
- Twin-engine
- Propeller-driven

Category III Aircraft (CAT III)

- Any other aircraft **NOT** described in either CAT I or CAT II

Restrictions and Limitations

Aircraft performance is affected by various factors. Some of these factors are:

- Weather conditions
- Load
- Engine performance
- Aircraft configuration
- Pilot's ability
- Speed
- Altitude
- Climb rate
- Weight class

Note: *Figures provided concerning performance data for each category are approximate. Some aircraft may exceed these performance ranges.*

Weight Classes

Aircraft weight classes are used for wake turbulence separation.

There are four weight classes for aircraft:

- Small
- Large
- Heavy
- Super

Weight Class Definitions

Small Aircraft of 41,000 pounds or less maximum certificated takeoff weight. ■ A "Small +" denotes an aircraft weighing between 12,500 pounds and 41,000 pounds	***Large*** Aircraft of more than 41,000 pounds maximum certificated takeoff weight, up to, but not including, 300,000 pounds.
	
Heavy Aircraft capable of takeoff weight of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.	***Super*** AIRBUS A-380-800 (A388) and ANTONOV An-225 (A225)
	

Knowledge Check A

REVIEW what you have learned so far about identifying aircraft. ANSWER the questions listed below.

1. Which weight class would be used to categorize an aircraft capable of 300,000 pounds of takeoff weight, but currently only having a takeoff weight of 225,000 pounds? *(Select the correct answer.)*
   - ❑ Small
   - ❑ Large
   - ❑ **Heavy**

2. What is the maximum certificated takeoff weight of an aircraft in the small weight class? *(Select the correct answer.)*
   - ❑ **41,000 pounds or less**
   - ❑ 12,500 pounds or less
   - ❑ More than 41,000 pounds
   - ❑ More than 12,500 pounds

3. What would the weight class be for an aircraft having a 250,000-pound maximum certificated takeoff weight? *(Select the correct answer.)*
   - ❑ Small
   - ❑ **Large**
   - ❑ Heavy

Aircraft Performance Characteristics

Note: *These operating characteristics are very general and there are many exceptions.*

CAT I

Aircraft in Category I are lightweight, single-engine, and propeller-driven, weighing 12,500 pounds or less.

Examples:

- C172 – Cessna Skyhawk
- BE35 – Beech Bonanza 35
- M20P – Mooney Ranger

General Performance Characteristics:

Speed: 100-160 knots
Altitude: 10,000 feet and below
Climb Rate: 1,000 feet per minute or less
Weight Class: Small (S)

CAT II

Aircraft in Category II are lightweight, twin-engine, and propeller-driven, weighing 12,500 pounds or less.

Examples:

- BE55 – Beech Baron 55
- PA34 – Piper Seneca
- PAY3 – Piper Cheyenne

General Performance Characteristics:

Speed: 160-250 knots
Altitude: FL 240 and below
Climb Rate: 1,000 – 2,000 feet per minute or less
Weight Class: Small (S)

CAT III

CAT III contains all aircraft not included in CAT I and II. These aircraft may be classified as small, large, heavy, or super weight class.

General Performance Characteristics:

Speed: 300 – 550 knots
Altitude: FL 450 and below
Climb Rate: 2,000 – 4,000 feet per minute
Weight Class: Specific for each aircraft

Note: *CAT III includes all turbojet aircraft.*

Helicopters

All helicopters are classified CAT I.

General Performance Characteristics:

Speed: 90 – 160 knots
Altitude: FL 200 and below
Climb Rate: 500 – 2,150 feet per minute
Weight Class: Small (S) – Large (L)

Knowledge Check B

REVIEW what you have learned so far about aircraft categories/performance characteristics. ANSWER the questions listed below.

Match the description to the correct category or weight class. Enter your answers in the spaces below.

1.

c	A large multi-engine turbojet aircraft	a. Category I
b	Small aircraft weighing 12,500 pounds or less, twin-engine, and propeller-driven	b. Category II
a	Small aircraft weighing 12,500 pounds or less, single-engine, propeller-driven, and all helicopters	c. Category III

2.

b	Aircraft weighing more than 41,000 pounds maximum certificated takeoff weight, up to, but not including, 300,000 pounds	a. Small b. Large
d	AIRBUS A-380-800 and ANTONOV An-225 (A225)	c. Heavy
c	Aircraft capable of takeoff weights of 300,000 pounds or more whether operating at that weight or not	d. Super
a	Aircraft weighing 41,000 pounds or less, maximum certificated takeoff weight	

3. **c** Aircraft normally operating at FL 450 and below, speed between 300-550 knots with a climb rate of 2,000-4,000 feet per minute.

a Aircraft normally operating at 10,000 feet MSL and below, speed between 100-160 knots with a climb rate of 1,000 feet per minute or less.

b Aircraft normally operating at FL 240 and below, speed between 160-250 knots with a climb rate of 1,000-2,000 feet per minute.

a. CAT I

b. CAT II

c. CAT III

Identifying Aircraft Summary

Air traffic controllers are constantly interacting with a large range of commercial and private aircraft, each with its own unique set of characteristics. Controllers must identify the weight classes and associated performance of each individual aircraft before they can give them proper and safe direction.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note: Aircraft Names and Designators*** lesson should have already been enabled in Blackboard, if not ensure the lesson is enabled ■ **ENABLE *Aircraft Names and Designators*** lesson in Blackboard ■ Instruct students to navigate to the ***Aircraft Names and Designators*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or ***Aircraft Recognition Flashcards*** until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

AIRCRAFT NAMES AND DESIGNATORS

Purpose: The purpose of this lesson is to define how aircraft names and designators are derived for civil and military aircraft.

Objective:

- Identify aircraft names
- Identify aircraft designators

References for this lesson are as follows:

- FAA Order JO 7360.1, Aircraft Type Designators
- ATG-2, Tri-Option Controller Reference Manual

Aircraft Designators

A designator will be derived from the manufacturer's model number or name, or from a common military type.

Used on:

- Flight progress strips
- Data blocks
- ATC communications

Designator: PA34

Designator: C130

Civil Designators

- In general, the first character(s) in a civilian aircraft type denotes the manufacturer; for example, the BE in BE55 means Beech Aircraft Company
- An aircraft designator will be a minimum of 2, but not longer than 4
- Designator characters may be all letters or a combination of letters and numbers

Designator: C550

Examples of Civil Names and Designators

Manufacturer	Model Name	Designators
Rockwell International Group	Commander	AC68
Beech Aircraft Company	Super King Air	BE20
Beech Aircraft Company	Baron 58	BE58
Cessna Aircraft Company	Skyhawk	C172
Cessna Aircraft Company	Citation	C550
Dehavilland	Dash-8	DH8A
Gulfstream Aerospace Corporation	Gulfstream 3	GLF3
Boeing Corporation	Boeing 737-300	B733
Gates Learjet Corporation	Learjet 35	LJ35
Bell Helicopter Textron	Bell 222	B222

Military Designators

Military designators are formulated by using two elements of information.

- First, the basic mission, represented by a letter denoting the primary function of the aircraft
- Second, the design numbers to denote the design or series of a basic aircraft configuration

Designator: F15

Examples of Military Names and Designators

Manufacturer	Model Name	Designators
Fairchild Aircraft	Thunderbolt 2	A10
Rockwell	Lancer	B1
McDonnell-Douglas	Globemaster 3	C17
Northrop Grumman	Joint STARS	E8
McDonnell-Douglas	Eagle	F15
Sikorsky	Black Hawk	H60
Lockheed	Orion	P3
Beechcraft	Texan II	TEX2

Knowledge Check C

REVIEW what you have learned so far about identifying aircraft. ANSWER the questions listed below.

1. Designators may have as many as _____ characters, but no less than _____. *(Select the correct answer.)*
   - ❑ 8; 4
   - ❑ 6; 3
   - ❑ **4; 2**
   - ❑ 3; 1

2. What is generally the first character in an aircraft designator? *(Select the correct answer.)*
   - ❑ Number
   - ❑ **Letter**
   - ❑ Letter or number
   - ❑ "N"

Aircraft Names and Designators Summary

The aircraft name and designator are additional components controllers use to differentiate between the various aircraft, their characteristics, and their limitations.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in the ***Identifying Aircraft*** and ***Aircraft Names and Designators*** lessons ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Aircraft Identification Features*** lesson in Blackboard ■ Instruct students to navigate to the ***Aircraft Identification Features*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or ***Aircraft Recognition Flashcards*** until other students have completed	Blackboard **EST. RUN TIME** 50 mins.

AIRCRAFT IDENTIFICATION FEATURES

Purpose: The purpose of this lesson is to describe features controllers can use to identify aircraft.

Objective:

- Identify identification features of aircraft

References for this lesson are as follows:

- ATG-2, Tri-Option Controller Reference Manual

Aircraft Identification Features

There are several features of aircraft controllers can use to identify them.

Some identification features of aircraft are:

- Size
- Engine location and number
- Engine type
- Wing placement
- Wing configuration
- Tail configuration
- Windows
- Fuselage
- Landing gear

Size	
Size may distinguish the difference between two aircraft that appear similar.	
	
	

Engine Location and Numbers

An aircraft's engine location will vary with size, design, and operational requirements. Engine locations can be found on, under, or through the wings; on or through the vertical stabilizer; and on the fuselage.

on fuselage (two)

under wing (two)

under wing and through tail (three)

under wing (four)

Aircraft Engine Types

There are three types of engines.

Reciprocating


BE58 Beechcraft Baron

A **reciprocating** engine (piston-engine) is found mostly on single-engine or light twin-engine aircraft and operates a propeller.

- Operates on gasoline
- Approximately 60 to 350 Horsepower
- Normally the lowest performance of the three engine types

Examples: BE58, PA34, C172

Turboprop


BE20 Super King Air

A **turboprop** engine is a turbine engine that operates a propeller.

- Operates on jet fuel
- Turbine engines create faster speeds and better performance than reciprocating engines

Examples: PAY1, BE20

Turbojet


C550 Citation II

A **turbojet** engine is commonly referred to as a "jet" engine and has no propeller.

- All jets are Category III aircraft
- Found in all weight classes
- Derives power from thrust or exhaust gases
- Currently the highest performance aviation engine commonly in use

Examples: B767, MD11, LJ35, F16

Wing Placement

There are three basic wing placements: high-wing – located on the top of the fuselage; mid-wing – mounted in the center or middle of the fuselage; and low-wing – located on the underside or beneath the fuselage.

High-Wing	Mid-Wing	Low-Wing
		
Cessna Skyhawk C172	Fighting Falcon F-16	Cherokee Arrow P28R

- Majority of aircraft are either high-wing or low-wing
- Wing placement is not limited to aircraft categories or weight classes

Other Types of Wing Placement

There are also other types of wing placement that are far less common.

Bi-Wing

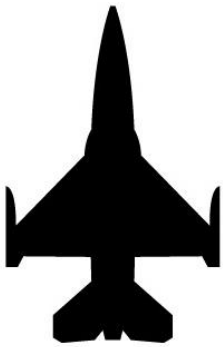
- Bi-wing (bi-plane), which was popular in the past but is not very common today

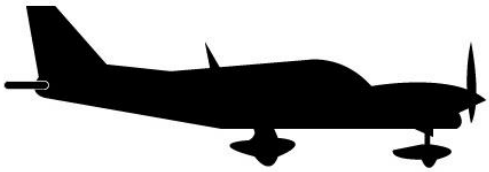
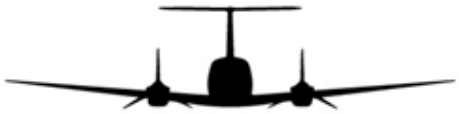
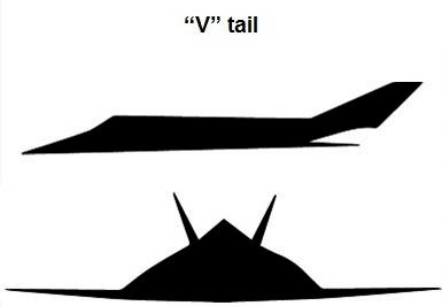
Canard

- Canard, found primarily on experimental aircraft, consists of an additional wing-like lifting surface located ahead of the cockpit near the nose of the aircraft

Wing Configuration

Each aircraft has a particular wing configuration (design) that is specifically created for its operational needs. There are three basic wing configurations: straight-wing, swept-wing, and delta-wing. Wing configuration is not limited to an aircraft category or a weight class.

Straight-Wing Configuration Piper Saratoga PA32	**Swept-Wing Configuration** MD11	**Delta-Wing Configuration** Fighting Falcon F16
		

Tail Configuration	
Tail configurations are made up of two main components: **vertical stabilizer** – has rudder attached at the rear of the stabilizer; and **horizontal stabilizer** – can be two pieces with attached elevator or one rigid piece called a stabilator. There are five basic tail configurations.	
	Conventional tail 
	Forward slant vertical stabilizer 
	Horizontal stabilizer above fuselage 
	"T" tail - straight 
	"V" tail 

Windows

In some cases, different aircraft can look very much alike. Windows may be the distinguishing factor that set like aircraft apart. Windows come in different shapes and sizes.

Oval

Round

Bubble Canopy

Teardrop

Square

Things to look for in windows are:

- The number
  - How many windows are there?
- The arrangement
  - Are they located aft of the door or half in front and half aft?
- The alignment
  - Are they all level or are some off-center or staggered?
  - Is the windshield sectioned or is it wrapped around?

Fuselage

There are three factors that contribute to the shape of fuselages.

Aircraft's design function
The function for transporting passengers or cargo will require a larger fuselage than that of a fighter aircraft.

Type of power plant or engine used
Turboprop and jet engine aircraft can achieve altitudes that require pressurization. This will influence the fuselage shape.

Materials used
The characteristics of materials such as wood/fiber, aluminum, or composites will affect the fuselage shape.

Landing Gear

There are two basic types of landing gear: tricycle and conventional.

Tricycle

- Consists of main left and right landing gear located aft of the aircraft's center of gravity
- One forward nose gear is located forward of the aircraft's center of gravity
- This is the most common type of gear found on today's aircraft

Conventional

- Aircraft with conventional landing gear are often referred to as 'tail draggers'
- Consists of main left and right landing gear located toward the front of the aircraft, forward of the center of gravity
- One tail wheel is located far aft of the aircraft

Landing gear may be either fixed or retractable.

Fixed

Fixed gears are the landing gears that hang permanently below the aircraft and are not moveable.

Retractable

Retractable gears are landing gears that retract into the fuselage for storage during flight.

Knowledge Check D

REVIEW what you have learned so far about aircraft identification features. ANSWER the questions listed below.

1. Which engine types have propellers? *(Select all correct answers that apply.)*
   - ❑ **Reciprocating**
   - ❑ **Turboprop**
   - ❑ Turbojet

2. What category are turbojet aircraft? *(Select the correct answer.)*
   - ❑ Category I
   - ❑ Category II
   - ❑ **Category III**

3. Which features are used to identify aircraft? *(Select all correct answers that apply.)*
   - ❑ **Engine**
   - ❑ **Tail**
   - ❑ Capacity
   - ❑ **Fuselage**
   - ❑ **Landing gear**

4. What are the three basic wing placement positions? *(Select all correct answers that apply.)*
   - ❑ **High-wing**
   - ❑ Upper-wing
   - ❑ **Mid-wing**
   - ❑ Lower-wing
   - ❑ **Low-wing**

5. What are the three basic wing shapes or configurations? *(Select all correct answers that apply.)*
   - ❑ **Delta-wing**
   - ❑ **Swept-wing**
   - ❑ Alpha-wing
   - ❑ Slant-wing
   - ❑ **Straight-wing**

6. What are the basic tail configurations? *(Select all correct answers that apply.)*
   - ❑ **"V"**
   - ❑ **Conventional**
   - ❑ Delta
   - ❑ **Horizontal stabilizer above the fuselage**
   - ❑ Vertical
   - ❑ **Forward slant vertical stabilizer**
   - ❑ **"T" (straight)**

7. What are the basic types of landing gear? *(Select all correct answers that apply.)*
   - ❑ Non-conventional
   - ❑ **Tricycle**
   - ❑ **Conventional**
   - ❑ Three-wheel

Aircraft Identification Features Summary

Your abilities to identify features of an aircraft will help you understand their unique capabilities and allow you to provide the guidance needed for safe separation.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in the ***Aircraft Identification Features*** lesson ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 20 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note: Aircraft Recognition Flashcards*** should have already been enabled in Blackboard, if not ensure they are enabled ■ Instruct students to navigate to the ***Exercise and Activities*** folder in Blackboard ■ Instruct students to locate ***Aircraft Recognition Flashcards*** ■ Allow students to determine to work individually, in small groups, or in teams as they review flashcards ■ Inform the students the content in the flashcards will be tested at the conclusion of the review session during the Aircraft Recognition Tournament ■ During review facilitator should engage with students by asking questions, evaluating responses and soliciting correct responses ■ Provide feedback and resolve any questions from students	Independent Review **EST. RUN TIME** 2 hrs.

AIRCRAFT RECOGNITION FLASHCARDS

Category I Aircraft	
Name: Skyhawk, Cutlass, Mescalero **Designator**: C172 **Manufacturer**: Cessna Aircraft Company **Recognition features:** • High/straight-wing with struts • Square windows • Conventional tail • Single-engine (prop) • Small weight class	
Name: Stationair **Designator**: C206 **Manufacturer**: Cessna Aircraft Company **Recognition features:** • High/straight-wing with struts • Conventional tail • Fixed landing gear • Single-engine (prop) • Small weight class	
Name: Cherokee **Designator:** P28A **Manufacturer:** Piper Aircraft Corporation **Recognition features:** • Low/straight-wing • Conventional tail with stabilator • Single-engine (prop) • Fixed landing gear • Small weight class	

Name: Caravan, Cargomaster, Grand Caravan
Designator: C208
Manufacturer: Cessna Aircraft Corporation
Recognition features:

- High-wing with wing struts, conventional tail
- Turbo-prop
- Cargo pod under fuselage; not all C208s will have the cargo pod
- Bigger than other single-engine Cessnas with more windows
- Small weight class

Name: Bonanza 35
Designator: BE35
Manufacturer: Beech Aircraft Company
Recognition features:

- Low/straight-wing
- "V" tail
- Retractable landing gear
- Single-engine (prop)
- Small weight class

Name: Bonanza 36
Designator: BE36
Manufacturer: Beech Aircraft Company
Recognition features:

- Low/straight-wing
- Conventional tail
- Retractable landing gear
- Single-engine (prop)
- Small weight class

Name: Mooney
Designator: M20R
Manufacturer: Mooney Airplane Company
Recognition features:

- Low/straight-wing
- Forward slant vertical stabilizer
- Single-engine (prop)
- Small weight class

Name: Tomahawk
Designator: PA38
Manufacturer: Piper Aircraft Corporation
Recognition features:

- Low/straight-wing
- "T" tail configuration with horizontal stabilizer slightly below the top
- Single-engine (prop)
- Modified bubble canopy with square side window
- Small weight class

Name: Malibu
Designator: PA46
Manufacturer: Piper Aircraft Corporation
Recognition features:

- Low/straight-wing
- Conventional tail
- Retractable landing gear
- Single-engine (prop)
- Small weight class

Name: Eagle
Designator: PC12
Manufacturer: Pilatus Aircraft
Recognition features:

- Low/straight-wing with winglets
- "T" tail
- Retractable landing gear
- Single-engine (turboprop)
- Small weight class

Name: Cirrus
Designator: SR22
Manufacturer: Cirrus Aircraft
Recognition features:

- Low/straight-wing
- Conventional tail
- Fixed landing gear
- Single-engine (prop)
- Small weight class

Name: Bell Ranger 206, Jet Ranger, Long Ranger, Kiowa
Designator: B06
Manufacturer: Bell Helicopter Textron
Recognition features:

- Helicopter
- Fuselage box-shaped
- Fixed skid rail gear
- Single turbo-shaft engine, single rotor
- Small weight class

Name: Bell 222
Designator: B222
Manufacturer: Bell Helicopter Textron
Recognition features:

- Helicopter
- Fixed skid rail gear or wheels
- Twin turbo-shaft engine, single rotor
- Small weight class

Category II Aircraft

Name: Commander
Designator: AC68
Manufacturer: Rockwell International Group
Recognition features:

- High/straight-wing
- Conventional tail
- Twin-engine (prop)
- Retractable landing gear
- Small weight class

Name: Baron
Designator: BE58
Manufacturer: Beech Aircraft Company
Recognition features:

- Low/straight-wing
- Conventional tail
- Twin-engine (prop) set forward on the wing
- Side windows are symmetrical
- Wheel pans are broad
- Small weight class

Name: Twin Cessna
Designator: C310
Manufacturer: Cessna Aircraft Company
Recognition features:

- Low/straight-wing (with wingtip gas tanks)
- Retractable landing gear
- Conventional tail
- Twin-engine (prop)
- Small weight class

Name: Golden Eagle, Executive Commuter
Designator: C421
Manufacturer: Cessna Aircraft Company
Recognition features:

- Low/straight-wing
- Sharp, pointed nose
- Conventional tail
- Twin-engine (prop)
- Small weight class

Name: Seneca
Designator: PA34
Manufacturer: Piper Aircraft Corporation
Recognition features:

- Low/straight-wing
- Conventional tail with stabilator
- Back window smaller
- Main gear wheel pans slim
- Twin-engine (prop)
- Small weight class

Name: Navajo
Designator: PA31
Manufacturer: Piper Aircraft Corporation
Recognition features:

- Low/straight-wing with winglets
- Conventional tail
- Twin-engine (prop)
- Retractable landing gear
- Square windows
- Small weight class

Name: Cheyenne
Designator: PAY3
Manufacturer: Piper Aircraft Corporation
Recognition features:

- Low/straight-wing (with wingtip gas tanks)
- Stubby, rounded nose
- "T" tail
- Rectangular wheel pans
- Twin-engine (turboprop)
- Small weight class

Category III Aircraft

Name: Super King Air
Designator: BE20
Manufacturer: Beech Aircraft Company
Recognition features:

- Low-wing
- Round windows
- "T" tail
- Twin-engine (turboprop) with large exhausts
- Small+ weight class

Name: Dash 8
Designator: DH8A, DH8B, DH8C, DH8D
Manufacturer: Dehavilland
Recognition features:

- High/straight-wing
- "T" tail
- Twin-engine (turboprop)
- Retractable landing gear
- DH8A and B, small +; DH8C and D, large weight class

Name: Beechjet
Designator: BE40
Manufacturer: Beech Aircraft Company
Recognition features:

- Low/swept-wing
- “T” tail
- Engines on fuselage
- Oval windows
- Small+ weight class

Name: Citation
Designator: C550
Manufacturer: Cessna Aircraft Company
Recognition features:

- Low/straight-wing
- Rectangular side windows
- Conventional tail
- Rounded nose
- Small+ weight class

Name: Citation X (10)
Designator: C750
Manufacturer: Cessna Aircraft Company
Recognition features:

- Low/swept-wing
- “T” tail with huge tail cone
- Pot belly
- Two jet engines (aft fuselage)
- Small+ weight class

Name: Challenger
Designator: CL60
Manufacturer: Bombardier (Canada)
Recognition features:

- Low/swept-wing with winglets and flap tracks under the wing
- “T” tail
- Large engines mounted high on side of fuselage
- Large weight class

Name: Falcon, Mystere
Designator: FA20
Manufacturer: Dassault-Breguet
Recognition features:

- Low/swept-wing
- Horizontal stabilizer above the fuselage (mid-tail)
- Two jet engines (aft fuselage)
- Small+ weight class

Name: Gulfstream
Designator: GLF3
Manufacturer: Gulfstream Aerospace Corporation
Recognition features:

- Low/swept-wing with winglets
- Round side windows
- "T" tail
- Two jet engines (aft fuselage)
- Large weight class

Name: Lear
Designator: LJ35
Manufacturer: Gates Learjet Corporation
Recognition features:

- Low/swept-wing with large wingtip tanks
- Distinctive windshield
- Oval windows
- "T" tail
- Two jet engines (aft fuselage)
- Small+ weight class

Name: Regional Jet
Designator: CRJ1, CRJ2, CRJ7, CRJ9
Manufacturer: Canada Air Bombardier
Recognition features:

- Low/swept-wing with winglets
- Larger version of the CL60 with a lot more windows
- "T" tail
- Two jet engines (aft fuselage)
- Large weight class

Name: Embraer 170/175 **Designator:** E170 **Manufacturer:** Embraer **Recognition features:** • Low/swept-wing with winglets • Nose shape at a 45-degree angle • Conventional tail • Two jet engines under wings • Large weight class	
Name: MD80 **Designator:** MD81, MD82, MD83, MD87, MD88 **Manufacturer:** McDonnell-Douglas Corporation **Recognition features:** • Low/swept-wing set way back on fuselage • Lots of windows • "T" tail • Two jet engines (aft fuselage) • Large weight class	
Name: Boeing 737 **Designator:** B731 through B739 **Manufacturer:** Boeing Corporation **Recognition features:** • Low/swept-wing • Conventional tail with a 45-degree tail spine from fuselage • Two flat-bottom jet engines, one under each wing • Winglets on the newer models • Large weight class	
Name: Airbus 318 through 321 **Designator:** A318 through A321 **Manufacturer:** Airbus **Recognition features:** • Low/swept-wing with arrowhead-shaped winglets • Conventional tail, no tail spine like the B737 • Two round jet engines under wings • Large weight class	

Name: Airbus 300
Designator: A306
Manufacturer: Airbus
Recognition features:

- Low/swept-wing with arrowhead-shaped winglets
- Dual-wheel trucks
- Two large engines under wings
- Heavy weight class

Name: Boeing 757
Designator: B752/B753
Manufacturer: Boeing Corporation
Recognition features:

- Low/swept-wing
- Nose droops down
- Tall gear struts
- Conventional tail
- Two jet engines under wings
- Large weight class

Name: Boeing 767
Designator: B762/B763/B764
Manufacturer: Boeing Corporation
Recognition features:

- Low/swept-wing
- Wide body, much wider than B757
- Bullet-shaped nose
- Conventional tail
- Two jet engines under wings
- Heavy weight class

Name: Boeing 777
Designator: B772/B773
Manufacturer: Boeing Corporation
Recognition features:

- Low/swept-wing
- Triple-truck landing gear
- Very long fuselage
- Bullet-shaped nose
- Conventional tail
- Two jet engines under wings
- Heavy weight class

Name: Boeing 727 **Designator:** B721/722 **Manufacturer:** Boeing Corporation **Recognition features:** • Low/swept-wing • "T" tail • Three jet engines (two aft fuselage and one through the tail) • Large weight class	
Name: MD11 **Designator:** MD11 **Manufacturer:** McDonnell-Douglas Corporation **Recognition features:** • Low/swept-wing with winglets • Conventional tail • Three jet engines (two under wing and one above fuselage through tail) • Heavy weight class	
Name: Boeing 747 **Designator:** B741 through B744 **Manufacturer:** Boeing Corporation **Recognition features:** • Low/swept-wing • Conventional tail • Four jet engines under wings • Forward fuselage higher than rear • Heavy weight class	
Name: Airbus 340 **Designator:** A342/343/345/346 **Manufacturer:** Airbus **Recognition features:** • Low/swept-wing with winglets • Conventional tail • Four jet engines on wings • Heavy weight class	

Name: Airbus 380-800
Designator: A388
Manufacturer: Airbus Industries
Recognition features:

- Low/swept-wing
- Conventional tail
- Four jet engines under wings
- Double decker

Name: Hercules
Designator: C130
Manufacturer: Lockheed Martin
Recognition features:

- High-wing
- Huge conventional tail
- Four turboprop engines on wings
- Large weight class

Name: Globemaster 3
Designator: C17
Manufacturer: McDonnell-Douglas Corporation
Recognition features:

- High-wing with winglets
- Huge “T” tail
- Four jet engines under wings
- Heavy weight class

Name: Extender
Designator: KC10
Manufacturer: McDonnell-Douglas Corporation
Recognition features:

- Low/swept-wing
- Conventional tail
- Three jet engines (two under wing, one above fuselage through tail)
- Heavy weight class

Name: Eagle
Designator: F15
Manufacturer: McDonnell-Douglas Corporation
Recognition features:

- Mid/delta-wing
- Twin tail
- Twin jet engines between vertical stabilizers
- Large weight class

Name: Fighting Falcon
Designator: F16
Manufacturer: General Dynamics
Recognition features:

- Mid/delta-wing
- Bubble canopy
- Conventional tail
- Single jet engine
- Large weight class

Name: Hornet or Super Hornet
Designator: F18
Manufacturer: McDonnell-Douglas Corporation
Recognition features:

- Mid/delta-wing
- Twin “modified V” tail
- Twin jet engines (between the vertical stabilizers)
- Large weight class

Name: Raptor
Designator: F22
Manufacturer: Lockheed Martin
Recognition features:

- Mid/delta-wing
- Twin “modified V” tail
- Large square intakes
- Twin jet engines between vertical stabilizers
- Large weight class

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Aircraft Recognition Tournament*** in ***Exercises and Activities*** folder in Blackboard ■ Instruct students to navigate to the locate the ***Exercises and Activities*** folder in Blackboard ■ Instruct students to locate student activity ***Aircraft Recognition Tournament*** ■ Instruct the students to locate ***Aircraft Recognition Tournament Answer Sheet*** in the ***Student Guide*** ■ The activity may be performed individually or collaboratively in small groups ■ Review detailed facilitator instructions included in the ***Aircraft Recognition Tournament*** listed below	Activity **EST. RUN TIME** 50 mins.

AIRCRAFT RECOGNITION TOURNAMENT

Purpose

To provide a review of aircraft recognition.

Directions

This activity is timed and all students will begin at the same time. **DO NOT** select **START** until you have been directed by the facilitator. You will be shown graphics of selected aircraft. Once the graphic is displayed, you will have 15 seconds to write down the name and designator for each aircraft. As a class, your answers will be evaluated at the end of the activity.

Detailed Facilitator Instructions: *This activity may be completed either individually or collaboratively in small groups/teams. Students will identify the aircraft by name and designator and enter responses on provided answer sheet. Once completed, answers will be evaluated as a class.*

- *Question slides are set on a timer and will automatically advance when initiated. Direct students to not begin the activity without direction from facilitator.*
- *Answer slides are not set on a time and will manually advance when directed by facilitator.*
- *Direct students to locate "Aircraft Recognition Tournament" from the Activities folder in Blackboard and locate "Aircraft Recognition Tournament Answer Sheet," in Student Guides.*
- *Direct students to select Aircraft Recognition Tournament link to open the activity. Once opened remain on title page. After all students have opened the activity and located the answer sheet, direct students to select NEXT to move to the instructions page of activity.*
- *Review the instructions orally and ensure they understand directions. A timer appears at the bottom of the screen that indicates the time remaining to respond to that question. When the timer expires the slide will auto advance to the next question. If the student completes recording his/her answer prior to time, they may select NEXT to move to next question.*
- *Ensure all students understand the instructions and then allow them to select START to begin. Students should move through the questions and record answers.*
- *At the conclusion of the questions the timer will stop at the TIMES UP page. Direct students to stop recording answers, but NOT select the ANSWERS button. When all students have completed the activity direct the class to select ANSWERS.*
- *As a class, move through the answer slides while students assess their answers. Encourage student discussion with this activity and resolve any questions the students may have on the activity for aircraft identification*

	Name	Designator
1	**Fighting Falcon**	**F16**
2	**Canadair Regional Jet**	**CRJ1, CRJ2, CRJ7, CRJ9**
3	**Skyhawk, Cutlass, Mescalero**	**C172**
4	**Falcon, Mystere**	**FA20**
5	**Seneca**	**PA34**
6	**Extender**	**KC10**
7	**(Grand) Caravan Cargomaster**	**C208**
8	**Boeing 777**	**B772, B773**
9	**Super King Air**	**BE20**
10	**Globemaster 3**	**C17**
11	**Cheyenne**	**PAY3**
12	**Jet Ranger / Long Ranger**	**B06**
13	**Commander**	**AC68**
14	**Citation**	**C550**
15	**Tomahawk**	**PA38**
16	**Hercules**	**C130**
17	**Bonanza**	**BE35**
18	**Citation X (10)**	**C750**
19	**Boeing 767**	**B762, B763, B764**
20	**Embraer 170, 175**	**E170**

SUMMARY

This purpose of this module was to introduce how different aircraft look and perform, and the written and visual identifiers of aircraft.

In accordance with FAA Order JO 7110.65, Air Traffic Control; FAA Order JO 7360.1, Aircraft Type Designators; and the ATG-2, Tri-Option Controller Reference Manual, you should now be able to:

- Identify categories of aircraft
- Identify weight classes of aircraft
- Identify performance characteristics of aircraft
- Identify aircraft names
- Identify aircraft designators
- Identify identification features of aircraft

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content ■ Instruct students to prepare for the End-of-Module test by putting away their Student Guides	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Aircraft Characteristics and Recognition End-of-Module Test*** link in Blackboard ■ Instruct students: ○ Clear desks ○ Do not write anything during or after the test ○ Navigate to the ***Aircraft Characteristics and Recognition End-of-Module Test*** link in Blackboard ○ Once they are satisfied with their responses, click “Save and Submit;” do not click “OK” to review results until directed to do so ○ Choose “Cancel” if they receive a warning message that the test has unanswered questions; choosing OK will submit the test and not allow them to go back and answer the questions ○ Leave the room after submitting the test and return at the “Be Back” time ■ ***Note:*** *This test is scored but not graded* ■ During test, monitor students to ensure a secure testing environment ■ Identify the most commonly missed questions by reviewing student statistics in Blackboard ■ Instruct students to click “View Results” when ready to review commonly missed questions ■ Review commonly missed questions with students	Blackboard Assessment **EST. RUN TIME** 20 mins.

END-OF-MODULE TEST (ANSWER KEY)

Note: *Test questions in Blackboard are presented to the students in random order. Please be aware the test key question order will not match the student version.*

1. Which of these is a characteristic of a CAT II aircraft? *(Select the correct answer.)*
   - ❑ **Propeller-driven**
   - ❑ Includes all helicopters
   - ❑ Weigh over 12,500 pounds
   - ❑ Single-engine

   Reference(s): JO 7110.65, Chap. 3

2. What weight class is an aircraft of 41,000 pounds or less maximum certificated takeoff weight? *(Select the correct answer.)*
   - ❑ **Small**
   - ❑ Heavy
   - ❑ Large
   - ❑ Super

   Reference(s): JO 7110.65, Chap. 2

3. What is the general climb rate of CAT III aircraft? *(Select the correct answer.)*
   - ❑ **2,000 – 4,000 feet per minute**
   - ❑ 1,000 – 2,000 feet per minute
   - ❑ 1,000 feet or less per minute
   - ❑ 1,000 – 3,000 feet per minute

   Reference(s): ATG-2, Part 1C

4. What is the designator for this aircraft? *(Select the correct answer.)*
   - ❑ **C17**
   - ❑ C130
   - ❑ KC10
   - ❑ C5

   Reference(s): JO 7360.1, Chap. 2

5. What type of landing gear consists of a nose gear located forward of the aircraft's center of gravity, and a main left and right landing gear located aft of the aircraft's center of gravity? *(Select the correct answer.)*
   - ❑ **Tricycle**
   - ❑ Fixed
   - ❑ Retractable
   - ❑ Conventional

   Reference(s): ATG-2, Part 2-H

6. What are the key recognition features of the B737? *(Select the correct answer.)*
   - ❑ **One jet engine under each wing, low-wing**
   - ❑ Two jet engines under each wing, low-wing
   - ❑ One jet engine under each wing, "T" tail
   - ❑ One jet engine in tail

   *Reference(s): A*TG-2; JO 7360.1

7. What is a prominent identifier of the C172? *(Select the correct answer.)*
   - ❑ **High-wing**
   - ❑ Conventional gear
   - ❑ Mid-tail
   - ❑ Turboprop

   *Reference(s): A*TG-2; JO 7360.1