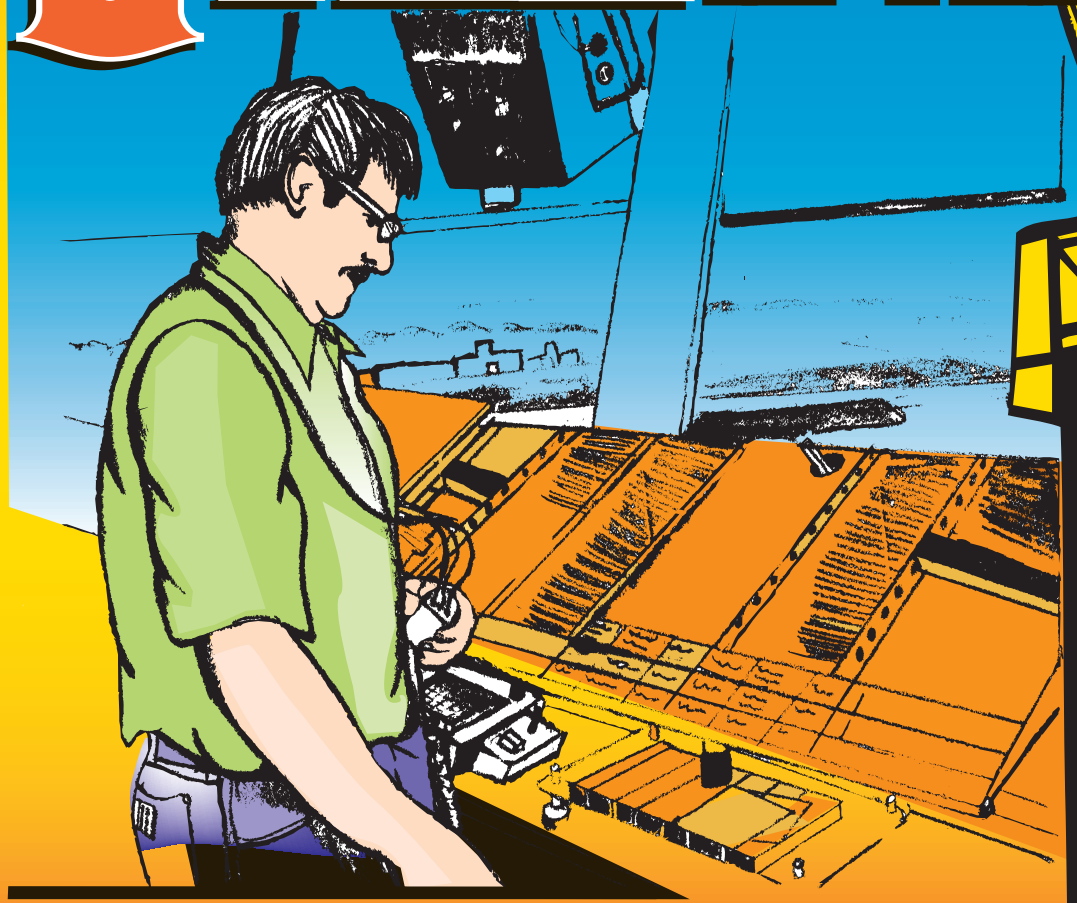
EYES IN THE SKY



Eyes in the Sky

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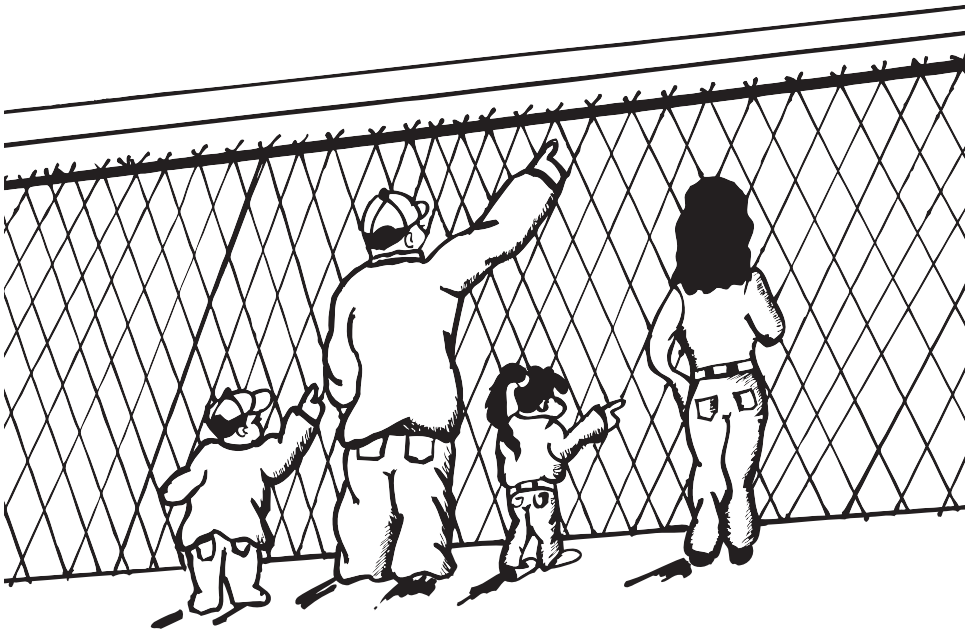
Introduction

This book introduces students of all ages to an exciting career as an air traffic controller. Everyday, over two million people travel across the skies of the United States while air traffic controllers are working to keep all air travelers safe. In this book, students can explore air traffic control centers, the National Airspace, and take a simulated flight to help them understand how the air traffic control system works. Learning activities are also included that utilize math, science, and reading skills. After reading and completing the activities in this book, students will be able to interpret a data block of numerical information into meaningful information, describe air traffic control centers and positions, state the International Aviation Phonetic Alphabet, calculate miles per hour from knots, identify phases of flight, and understand air traffic control vocabulary.

Contents

Eyes in the Sky



Look up in the sky, and chances are there will be airplanes flying by. Have you ever wondered where they're going, or why they don't get lost? How do airplanes remain safely in the sky when there are over 50,000 of them flying at one time?

It takes many well-trained people to safely guide airplanes through the skies. These trained professionals are called **Air Traffic Controllers (ATC)**. Their job is to keep airplanes a safe distance apart within the **airspace** they're assigned to monitor. Air traffic controllers call this safe distance, **separation**.

Twenty-four hours a day, seven days a week, controllers are on duty across the country keeping a watchful "eye in the sky." While many people would find it hard to even imagine, air traffic controllers are guiding airplanes traveling overhead at 500 miles an hour. Some of these airplanes are carrying hundreds of passengers. There are even a few super-jumbo jets that can carry up to 800 passengers, flying overhead!

Most controllers work for the **Federal Aviation Administration (FAA)** in three air traffic control (ATC) facilities: **Control Towers, Terminal Radar Approach Control, and En Route Centers.**

Let's see how the air traffic system works and then take a flight together!

** Look in the glossary for the words in **bold**.*

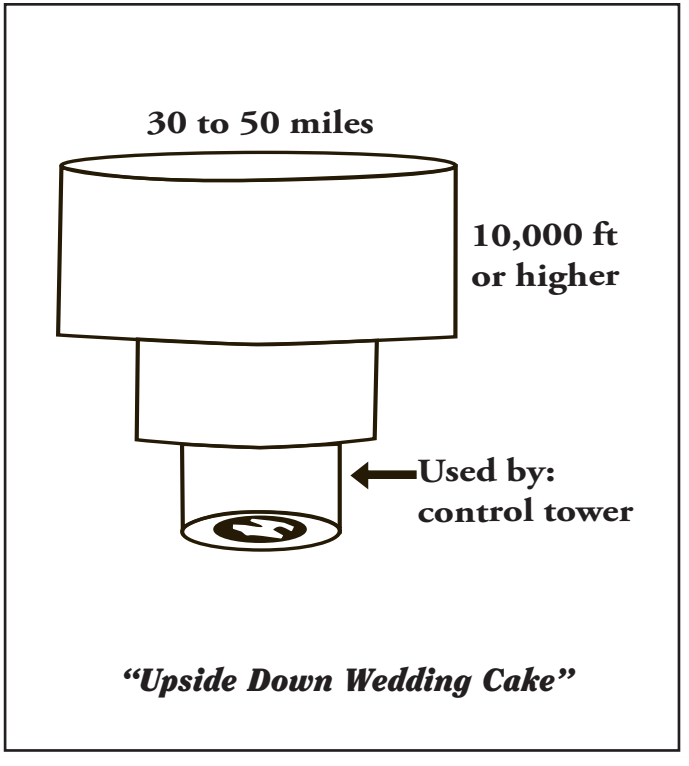
Who Does What

Terminal Facilities

Air Traffic Controllers that work in Control Towers and Radar Approach Control Centers are called **Terminal Controllers**. They help to separate airplanes at and around airports. There are two positions a terminal controller may work: **Tower** and **Radar**. **Tower Controllers** separate airplanes by looking out the window and seeing them with their eyes or using field glasses. When controllers cannot see airplanes, or if the planes are just too far away, they will "see" them using radar. These men and women are called **Radar Controllers.** They work in the **TRACON** (Terminal Radar Approach Control).

1. Air Traffic Control Tower (ATCT)

When thinking of an Air Traffic Control Tower, picture a glassed-in room (called a **tower cab**) on top of a tall, narrow building (a **control tower**) at an airport. The tower cab gives controllers a clear view of the airport. Tower controllers use their eyes or binoculars to see or guide airplanes and motor vehicles on airport **taxiways** and **runways**, as well as airplanes landing, or taking off. Most busy airports have a control tower.



2. Terminal Radar Approach Control (TRACON)

The TRACON is a dark, windowless room usually located in the control tower below the tower cab. It's called the radar room and is filled with **radarscopes** that show the locations, **ground speeds**, and other details of the airplanes in their area.

The TRACON has authority over **airspace** that looks like an upside down wedding cake (see diagram above). This airspace usually starts at the ground and stretches out from the airport for about 30 miles and up to 10,000 feet high. The air traffic control tower controls the airspace 5 miles around the airport and up to 2,500 feet above the ground.

3. En Route Air Route Traffic Control Center (ARTCC)

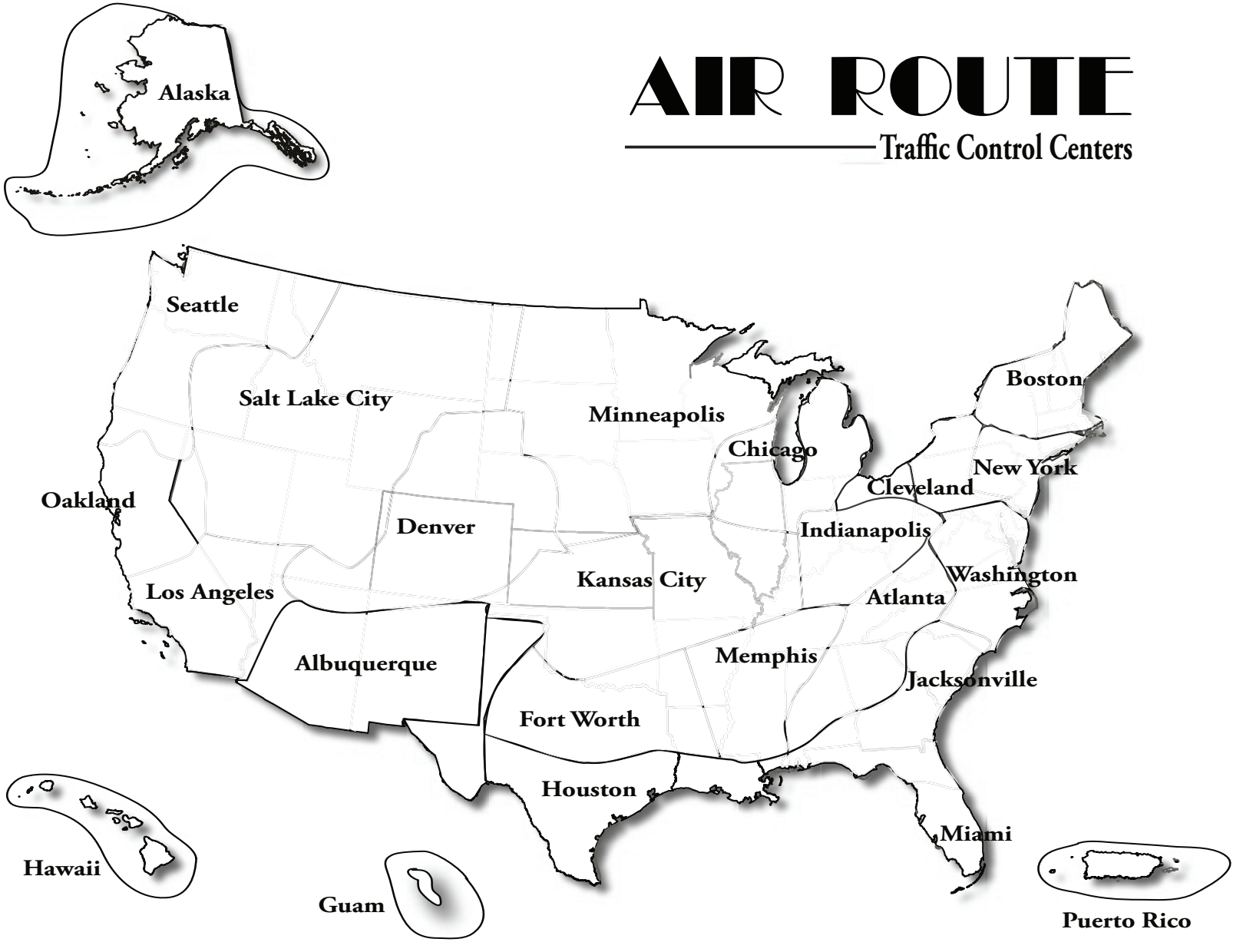
There are 24 **ARTCC**s commonly called "En Route Centers" or simply "Centers" in the United States (including Guam and Puerto Rico). Most En Route Centers are located some distance away from the airport. Like TRACON controllers, Center controllers work in large rooms with no windows and use radar to see and separate airplanes.

Center controllers guide airplanes through many thousands of miles of airspace every day. They keep airplanes that are flying between airports a safe distance apart.

Each Center's airspace can cover several states and may include 100,000 square miles or more. To make traffic more manageable, each Center is then divided into smaller areas called "**sectors**". Each sector has a controller who is assigned to work in that smaller area.

AIR ROUTE

Traffic Control Centers



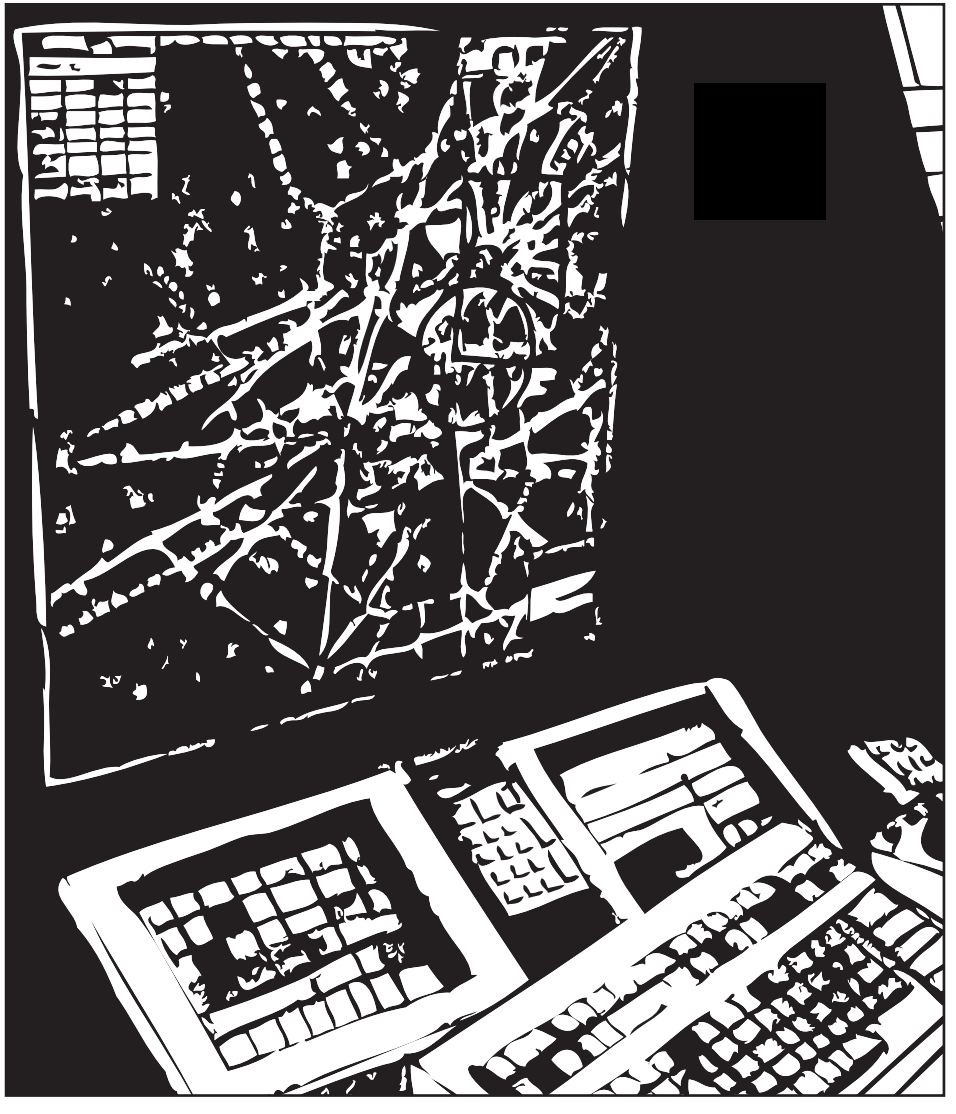
ATC Word Search

FIND THE AIR TRAFFIC CONTROL WORDS IN THE PUZZLE

Here are some words related to air traffic control. See how many words you can find in the puzzle. Circle your answers. Words can appear forward, backward, up, down, or diagonally. Answers are on the last page of this book.

RADAR
SAFETY
RUNWAY
AIRSPACE
PILOT
TAXI
EN ROUTE
AIRPORT
TOWER
AIRPLANE
LANDING
FLY
AIR TRAFFIC CONTROL
TRACON
CENTER
TERMINAL
SECTOR

F A N P I L O T E N A S F
H I I L F D O J Y J D E N
A R B R O A I R S P A C E
H C T E P O S L B X C G A
N A R F C O D V A D S T Q
A N T L W O R N I Y T O Y
R J R I P P O T R R X W D
I V A U H C D J P K M E J
A X F S R J Z C L S A R V
L A N D I N G K A P H N X
O L T A Y S D R N V C O W
R B R C U K V D E S P Z B
A S P E H B R X A S I O J
R Q K C Z R J U J F L Y U
X S E C T O R X N E S D A
C S F G S I X N Y W I T I
F E N R O U T E D U A L R
A I R C O N S R J M L Y T
S E F I K L A O T E R Z R
G Y O J M D B C T C V I A
O T C M A T N T R O M C F
J E V R D H A E A E D E F
U F M O L I T R J T A X I
I A K N I M V M C E T N C
U S S S M F J I H R U N C
N H W F K L Z N A Z M G O
H U N H B T R A C O N F N
V S R G W F T L E A N V T
C E N R W S N T E R A R R
U F V J K Z X I N K H A O
R E T N E C U K R I S G L



Radar

Controllers use a radarscope to guide multiple airplanes safely and efficiently at one time. The radarscope helps the controller "see" where each airplane is located. Radarscopes also display maps of the area the controller is working. The maps **depict** "highways in the sky" that airplanes fly along. These "highways" are actually crisscrossing air routes, called **airways**.

The most important information on the radarscope is the airplane's radar "**target**." The airplane's target shows up as a heavy diagonal line on the radar screen and represents the actual location of the airplane. A trail of light lines behind it is called its "history" and indicates where the airplane has just been. A block of information about the airplane is attached to the radar target. This is called a **data block** and contains important information about the flight.

Data Blocks

The data block shows four lines of information which are written in a "controller's" language. An example of a center controller's radarscope is on the following page which shows a map, radar targets, and data blocks. Look at the data block information on UAL353 (see page 15) to discovery what each line of information means.

The first line is the **call sign** of the airplane. This is simply what the airplane or flight is called, like a name. For the flight known as UAL353, it is a United Airlines flight: "United three-fifty-three".

The second line is for **altitude**. Airplanes are climbing, descending, or in level flight at an altitude (called an assigned altitude), given to the pilot by ATC. If the airplane is climbing or descending, the arrow will point up or down. To the right of the arrow will be the airplane's present reported altitude. To find the actual altitude of the airplane multiply the altitude number by 100. For instance: UAL353 has been assigned an altitude by air traffic control of 210 (210 x 100 = 21,000 feet.) It is at 200 (200 x 100 = 20,000 feet) and still climbing.

When the airplane reaches its assigned altitude, a 'C' appears next to the altitude. An example of this is target N5191R on the north side of the radarscope.

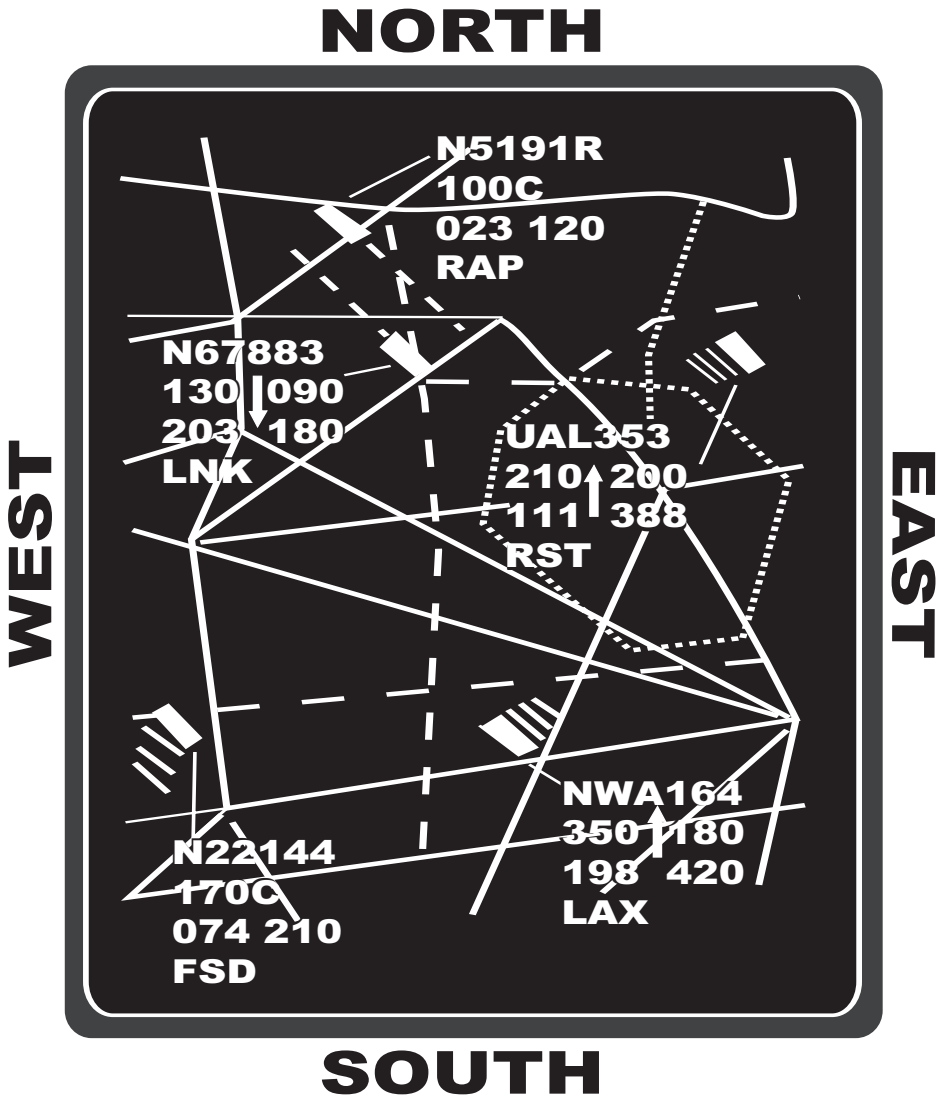
The third line is the computer ID / ground speed. The first three digits of this line are computer generated random numbers that are assigned to keep track of the airplane during its flight. The next three numbers show the ground speed of the airplane, which is 388 **knots per hour** (similar to miles per hour, see conversion below).

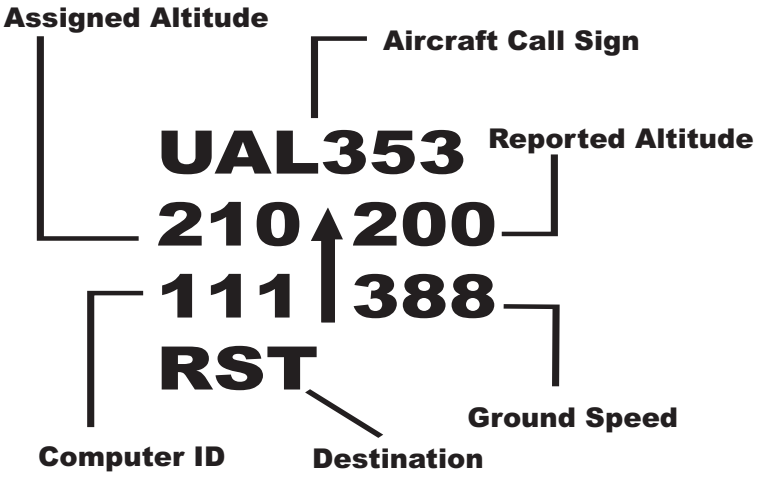
The fourth line is the airport destination. All airports have a three-letter code to quickly and easily identify them. In this data block, RST means Rochester, Minnesota.

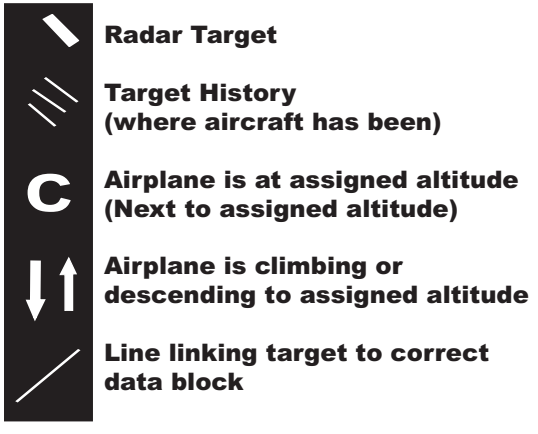
Activity: Convert Knots Per Hour to Miles Per Hour

Use the ground speed of each airplane listed on the data block and convert the ground speed from knots per hours into miles per hour. Simply multiply the ground speed in knots per hour by 1.15 to get the ground speed in miles per hour. For example, airplane N67883 is traveling 180 knots per hour. Converting the ground speed to miles per hour, the answer would be 207. 180 kph x 1.15 = 207 mph.

1. How many miles per hour is N5191R traveling?
2. How many miles per hour is UAL353 traveling?
3. How many miles per hour is N22144 traveling?


NORTH
WEST
EAST
SOUTH
N5191R
100C
023 120
RAP
N67883
130 090
203 180
LNK
UAL353
210 200
111 388
RST
NWA164
350 180
198 420
LAX
N22144
170C
074 210
FSD


Assigned Altitude
Aircraft Call Sign
UAL353
Reported Altitude
210 200
111 388
RST
Ground Speed
Computer ID
Destination


Radar Target
Target History
(where aircraft has been)
C
Airplane is at assigned altitude
(Next to assigned altitude)
Airplane is climbing or
descending to assigned altitude
Line linking target to correct
data block

Data Block Activity

See if you can answer the following questions by using the information from the radarscope data block on page 9. The compass directions: north, south, east, and west are given. Answers are on page 18 of this book.

1. Which airplane is going the slowest speed? _____

2. What is the aircraft call sign of the airplane that is at 100 (10,000 feet)? _____

3. Which airplane is farthest north? (Use the airplane target, not the data block.) _____

4. Which two airplanes are climbing to a higher altitude? _____

5. Which airplane's destination is the FSD airport? _____

6. What is the aircraft call sign of the airplane that is at 170 (17,000 feet)? _____

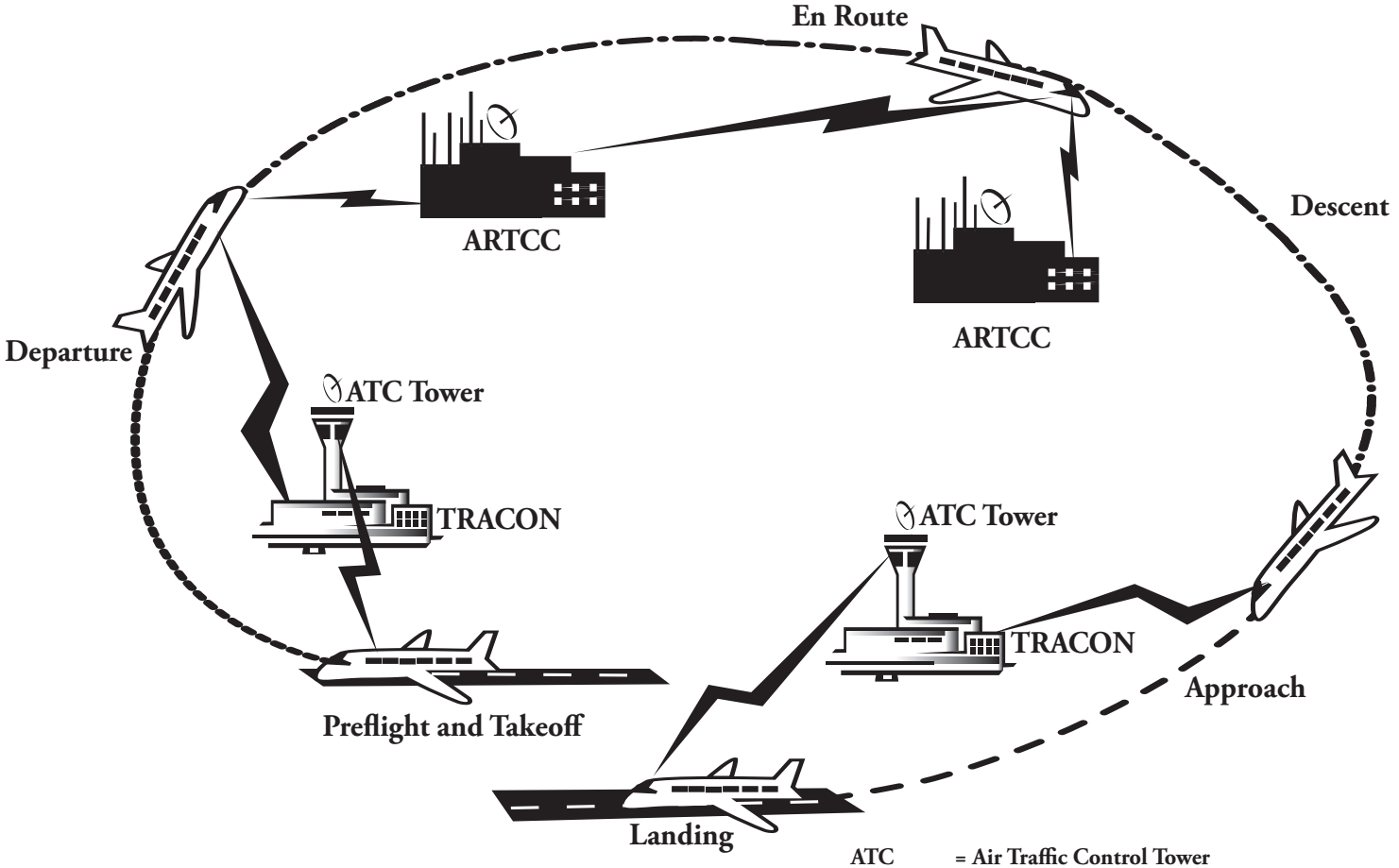
7. Which airplane has a ground speed of 180 knots per hour? _____

8. Which airplane is the farthest west? (Use the airplane target, not the data block.) _____

9. Which airplane is the farthest east? (Use the airplane target, not the data block.) _____

10. Which two airplanes are heading in opposite directions? _____

Let's Take A Flight



Perhaps the best way to understand how the air traffic control system works is to take a flight. Are you ready for a little "flight of discovery"? To make it easier to understand, the flight has been divided into seven phases: **preflight, takeoff, departure, En Route, descent, approach,** and **landing**. The example above shows the phases of flight and the airspace the airplane will fly through.

Preflight

"We are ready to board the flight!" With excited anticipation passengers arrive at the **airport terminal** to check their bags. At the same time the **flight crew** is already checking the airplane to be sure it is ready to fly. Based on the weather for that day, the pilot will plan the best and most efficient route and altitude for the flight. The pilot's flight plan is then communicated to a controller who checks traffic along that route to see if the request can be granted. Having the flight information ahead of time, the controllers can safely guide the flight from one city to another.

While passengers find their seats and stow their carry-on luggage, the pilot starts the radio communication with the tower. The cockpit flight crew informs the controller, located in the tower cab, that they are about ready to begin the flight. The controller will guide the airplane from the **gate** along the taxiways to the runway.

Takeoff

At the end of the runway, the tower controller tells the pilot to stop and wait for further instructions. The controller is responsible for all airplanes taking off, landing, or flying close to the airport. When the pilot radios for permission to take off, the controller visually checks the runways and surrounding area for other traffic that might be in the way. When the controller determines that the runway area is clear, the pilot is permitted to **taxi** onto the runway and take off.

The airplane will start to move down the runway, and when it reaches a specific speed, it will lift off the ground. Passengers may feel like they are being pushed back in their seat as the airplane accelerates. They will also hear the **landing gear** rumble as it **retracts** into the airplane's **wheel wells**. Now airborne, the airplane is on its way to its destination. At this point, the controller tells the pilot to, "Contact Departure Control."

Departure

"Look at the ants!" As the airplane climbs to its assigned altitude, one can see the earth below and maybe even the clouds above. The cars on the highways appear as if they are tiny ants slowly crawling along. The houses look like miniature houses.

At this point of the flight passengers are settling in to read, take a nap, or just relax, however, this is a very busy time for the pilots. The pilots must listen carefully to the instructions from ATC while flying the airplane and monitoring all its gauges and instruments.

The TRACON controller responsible for this phase of flight is called the departure controller. This controller uses all the information on the radarscope to safely guide the flight

through TRACON airspace. As the airplane climbs higher, departure control might give the pilots a new **compass heading** or altitude change to avoid other aircraft or hazards.

Once the flight reaches the outer limits of the TRACON airspace, the departure controller passes the flight on to the En Route Center. The controller will then say: "Contact Center."

En Route

The airplane may still be climbing to an altitude of over 30,000 feet when it enters En Route Center airspace. At some point during the flight phase, the airplane will reach its assigned altitude. If a passenger is going to be served anything to eat or drink, this is the time that will happen. The **captain** may turn off the seat belt sign so passengers can move about and stretch their legs.

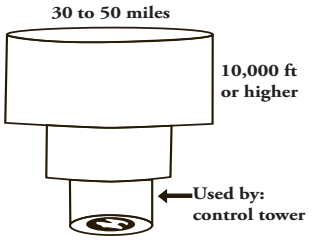
Like TRACON controllers, En Route Center controllers track airplane radar targets and data blocks. The center may tell the pilot about any significant weather such as thunderstorms or **turbulence** along the way. If it becomes necessary, the controller will request that the pilots adjust their flight's altitude, speed, or direction to avoid weather or other airplanes. The airplane is quietly passed from one controller to the next as the flights progresses toward it's intended destination

Descent

The "Fasten Seat Belt" sign is turned on when the airplane is about 200 miles from its destination, as the pilot prepares to descend. Some passengers may feel a little like they are floating in their seat for a moment as the airplane begins to descend for its arrival at the airport. Approximately 50 miles from the airport, the radar control is passed on to the TRACON and the controller tells the pilot to "Contact Approach Control."

Approach

"Wedding cake?" The airplane is entering TRACON airspace which is shaped like an upside down wedding cake (see diagram on the right). This time it's the **Approach Controller** who guides the airplane closer to the runway. The approach controller will direct the pilot to gradually lower the airplane's altitude. The pilot may make several turns until the airplane is lined up with the center of the runway. Working in this airspace is no 'piece of cake' for pilots and controllers, as airplanes fly at quickly changing airspeeds and altitudes. The approach controller often has a long line of airplanes descending in **sequence** for landing. In fact, this line of airplanes in the sky may extend out 50 miles or more! When the airplane is about 10 miles from the airport, the pilot is told to "Contact Tower."



"Upside Down Wedding Cake"

Landing

"Well this has been a great flight." At this point, the pilot will receive instructions from the tower controller in the tower cab. When clearance to land is received the pilot will announce to passengers we are cleared to land. The passengers will feel the airplane's wheels touch down on the runway. As the pilot applies the brakes, they will also feel the airplane quickly slow down.

After the airplane taxis off the runway, the tower controller will direct the airplane around the airport to the gate where the passengers will exits. The pilot will remind everyone to remain seated until the airplane comes to a complete stop at the gate. Remember, the pilot is responsible for everyone's safety while they are inside the airplane.

The next time anyone who has read this book looks up into the sky and sees an airplane flying by, they will know that skilled and knowledgeable people are watching every move that airplanes makes.

Now, readers should have a newly found respect for the men and women whose job is to be the "*Eyes in the Sky*" to keep us safe when we fly. Who knows? Maybe some day, the voice on the other end of the radio giving instructions to pilots, may be yours!

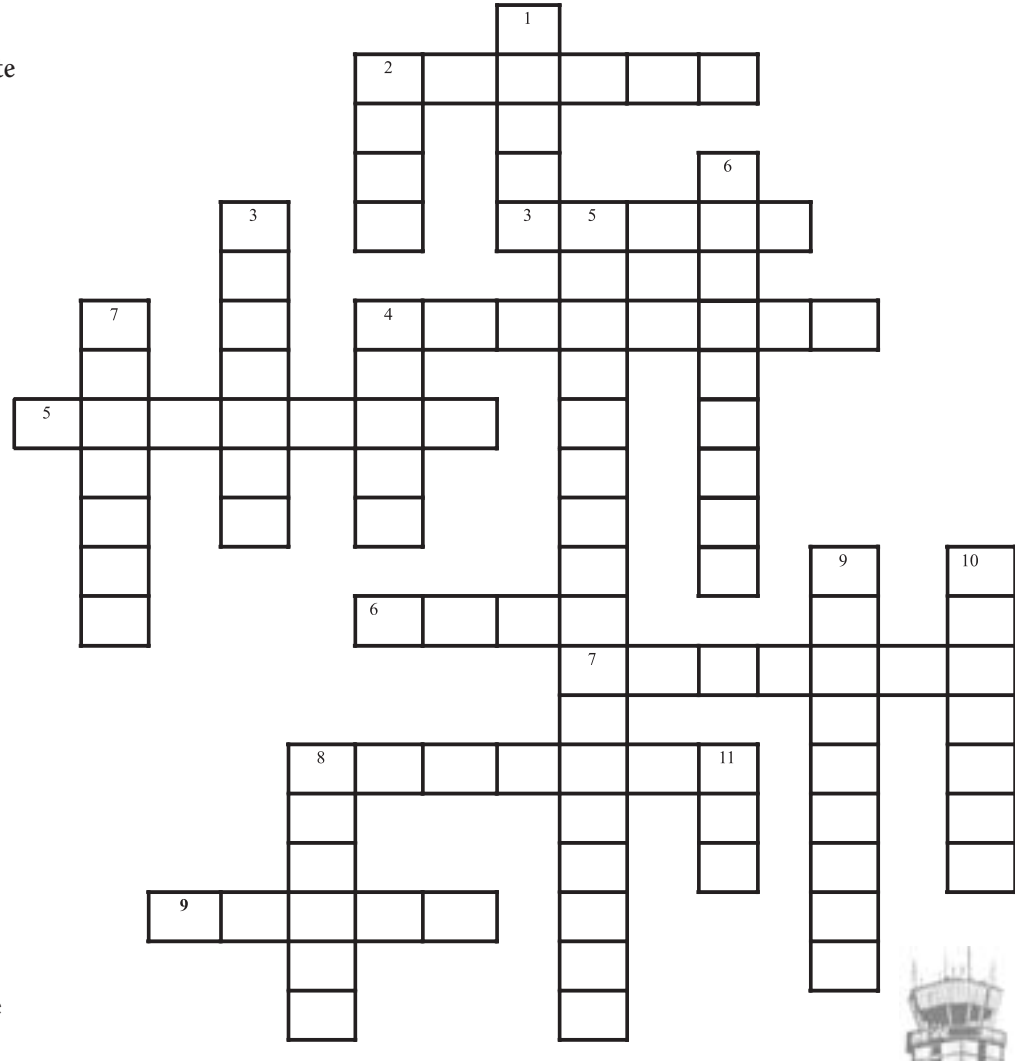
ATC Crossword Puzzle

ACROSS

2. The last controller to talk to the pilot before the flight gets to the gate
3. What controllers use to “see” airplanes
4. The TRACON controller in charge of an airplane in the descending phase
5. The phase of flight where the assigned altitude is usually reached
6. Before takeoff, airplanes must _____ to the runway
7. ARTCCs are also called
8. The phase of flight when the airplane lifts off the ground
9. _____ controllers give pilots permission to land

DOWN

1. The facility that handles airplanes at the airport
2. One of 24 centers
3. ARTCCs are subdivided into smaller work areas called ____
4. The facility responsible for en route airplanes
5. ATC stands for
6. Aircraft information that is shown on the radarscope
7. The phase at the end of the flight when the airplane is being guided by the tower
8. This center controls the airspace that looks like an upside down wedding cake
9. The phase of flight when passengers are boarding the airplane
10. When 200 miles from its destination, the flight is entering this phase
11. Most controllers work for which government agency



International Civil Aviation Organization Phonetic Alphabet

Pilots, flight dispatchers, air traffic controllers, and others who need to communicate with aircraft use the International Civil Aviation Organization (ICAO) phonetic alphabet. This special alphabet is used to ensure that one letter sounding like another doesn't get confused during communications. The letters "M" and "N" sound almost the same. Over the radio it might be hard to know exactly which letter was being said, so "Mike" and "November" are used instead.

By using these words of the phonetic alphabet radio messages that contain a series of letters and numbers, such as aircraft identification numbers, are less confusing. Also, when numbers are used over the radio, each number is spoken the same way one would pronounce it, with the exception of the number nine which is pronounced "niner."

* All pilots, aircraft dispatchers, and air traffic controllers must be able to speak, read, and understand the English language.

A	Alpha	**H**	Hotel	**O**	Oscar	**V**	Victor
B	Bravo	**I**	India	**P**	Papa	**W**	Whiskey
C	Charlie	**J**	Juliet	**Q**	Quebec	**X**	X-ray
D	Delta	**K**	Kilo	**R**	Romeo	**Y**	Yankee
E	Echo	**L**	Lima	**S**	Sierra	**Z**	Zulu
F	Foxtrot	**M**	Mike	**T**	Tango		
G	Golf	**N**	November	**U**	Uniform		

KNOW YOUR A-B-C's and 1-2-3's

Directions: Use the International Civil Aviation Phonetic Alphabet to help you spell out the words below.

1. Alpha-India-Romeo-Papa-Lima-Alpha-November-Echo
2. Romeo-Uniform-November-Whiskey-Alpha-Yankee
3. Charlie-Oscar-November-Tango-Romeo-Oscar-Lima-Lima-Echo-Romeo
4. Tango-Oscar-Whiskey-Echo-Romeo Charlie-Alpha-Bravo
5. Alpha-India-Romeo-Sierra-Papa-Alpha-Charlie-Echo
6. Delta-Alpha-Tango-Alpha Bravo-Lima-Oscar-Charlie-Kilo
7. November-One-Three-Niner-Five

Directions: Use the International Civil Aviation Phonetic Alphabet to say each word below.

8. P-I-L-O-T
9. T-A-K-E-O-F-F
10. R-A-D-A-R
11. T-R-A-C-O-N
12. S-E-C-T-O-R-S
13. N-1-6-4-9-D
14. S-A-F-E-T-Y

Answers to Activities

Convert Knots per hour to Miles per hour

1. 120 kph x 1.15 = 138 mph
2. 388 kph x 1.15 = 446 mph
3. 210 kph x 1.15 = 242 mph

Data Block Questions

1. N5191R (120 knots)
2. N5191R
3. N5191R
4. UAL353 and NWA164
5. N22144
6. N22144
7. N67883
8. N22144
9. UAL353
10. N5191R (northwest)
    and N67883 (southeast)
    OR N22144 and NWA 164
    OR UAL353 and NWA164

Crossword Puzzle

ACROSS

2. GROUND
3. RADAR
4. APPROACH
5. EN ROUTE
6. TAXI
7. CENTERS
8. TAKEOFF
9. LOCAL

DOWN

1. TOWER
2. GUAM
3. SECTORS
4. ARTCC
5. AIR TRAFFIC CONTROL
6. DATABLOCK
7. LANDING
8. TRACON
9. PREFLIGHT
10. DESCENT
11. FAA

Know Your A-B-C's and 1-2-3's

1. Airplane
2. Runway
3. Controller
4. Tower Cab
5. Airspace
6. Data Block
7. N1395
8. Papa-India-Lima-Oscar-Tango
9. Tango-Alpha-Kilo-Echo-Oscar-Foxtrot-Foxtrot
10. Romeo-Alpha-Delta-Alpha-Romeo
11. Tango-Romeo-Alpha-Charlie-Oscar-November
12. Sierra-Echo-Charlie-Tango-Oscar-Romeo
13. November-One-Six-Four-Niner-Delta
14. Sierra-Alpha-Foxtrot-Echo-Tango-Yankee

Word Puzzle

F	A	N	P	I	L	O	T	E	N	A	S	F
H	I	I	L	F	D	O	J	Y	J	D	E	N
A	R	B	R	O	A	I	R	S	P	A	C	E
H	C	T	E	P	O	S	L	B	X	C	G	A
N	A	R	F	C	O	D	V	A	D	S	T	Q
A	N	T	L	W	O	R	N	I	Y	T	O	Y
R	J	R	I	P	P	O	T	R	R	X	W	D
I	V	A	U	H	C	D	J	P	K	M	E	J
A	X	F	S	R	J	Z	C	L	S	A	R	V
L	A	N	D	I	N	G	K	A	P	H	N	X
O	L	T	A	Y	S	D	R	N	V	C	O	W
R	B	R	C	U	K	V	D	E	S	P	Z	B
A	S	P	E	H	B	R	X	A	S	I	O	J
R	Q	K	C	Z	R	J	U	J	F	L	Y	U
X	S	E	C	T	O	R	X	N	E	S	D	A
C	S	F	G	S	I	X	N	Y	W	I	T	I
F	E	N	R	O	U	T	E	D	U	A	L	R
A	I	R	C	O	N	S	R	J	M	L	Y	T
S	E	F	I	K	L	A	O	T	E	R	Z	R
G	Y	O	J	M	D	B	C	T	C	V	I	A
O	T	C	M	A	T	N	T	R	O	M	C	F
J	E	V	R	D	H	A	E	A	E	D	E	F
U	F	M	O	L	I	T	R	J	T	A	X	I
I	A	K	N	I	M	V	M	C	E	T	N	C
U	S	S	S	M	F	J	I	H	R	U	N	C
N	H	W	F	K	L	Z	N	A	Z	M	G	O
H	U	N	H	B	T	R	A	C	O	N	F	N
V	S	R	G	W	F	T	L	E	A	N	V	T
C	E	N	R	W	S	N	T	E	R	A	R	R
U	F	V	J	K	Z	X	I	N	K	H	A	O
R	E	T	N	E	C	U	K	R	I	S	G	L

Glossary

Air Traffic Controller – A person who communicates with a pilot, usually by radio, directing the movement of aircraft, especially close to an airport.

Airport Terminal – The area where airplanes are parked to allow passengers to get on or off an airplane.

Airspace – Any portion of the atmosphere above the earth.

Airways – Highways in the sky.

Altitude – The height that an aircraft is flying above the ground, usually expressed in the number of feet above sea level.

Approach – The phase of flight in which an aircraft has started its descent toward its destination. The pilot aligns the airplane with the designated landing runway.

Approach Controller – Controllers that are responsible for separating aircraft as they approach busy airports.

ARTCC – Air Route Traffic Control Centers. Each ARTCC manages traffic within all sectors of its center except for tower and TRACON.

Call Sign – The name used by the pilot or air traffic controller to identify an airplane or flight.

Captain – The pilot in command in charge of the flight, who usually sits in the left seat of the flight deck.

Compass Heading – The course or direction in which an aircraft is moving, generally expressed in degrees of a circle (from zero to 360) North, East, South, West.

Control Tower – A tall building from which air traffic controllers direct the movement of airplanes on and around an airport.

Data Block – Information used by an air traffic controller to identify an airplane on their radarscope.

Departure – The portion of the flight when the plane lifts off the ground and climbs to a cruising altitude.

Depict – To represent in pictures or words.

Descent – The portion of the flight in which an airplane has started to return to the earth.

En Route – The portion of the flight in which an airplane travels on the way to its destination airport.

En Route Center – A Center from which controllers separate airplanes going between airports and airspace that are not controlled by other facilities. Also called ARTCC.

Federal Aviation Administration (FAA) – The branch of the U.S. government that establishes and enforces rules for aviation.

Flight Crew – Two pilots, a captain and first officer, who are responsible for the safety of the airplane and flight.

Gate – A doorway through which passengers proceed when boarding or leaving an airplane.

Ground Speed – The actual speed that an aircraft travels over the ground corrected for windspeed and direction.

Landing – When an airplane touches down or lands after being in flight.

Landing Gear – A system of wheels that are used to support an aircraft when it is on the ground.

Preflight – Before a pilot gets into the airplane, he or she will check that the aircraft's equipment and systems are working properly.

Radar – A system that uses electronic pulses to track the direction and speed of aircraft.

Radar Controller – Air traffic controllers that use radar to help them track airplanes.

Radarscope – A viewing screen that displays information from the radar to keep track of airplanes.

Retracts – Landing gear that fold up inside the airplane once it becomes airborne.

Runway – A strip of level, usually paved ground on which airplanes take off and land.

Sectors – Smaller areas of airspace controlled by a Center.

Separation – Keeping airplanes a safe distance apart.

Sequence – To organize and arrange in a specific order.

Takeoff –The point in a flight when the airplane leaves the ground or runway and becomes airborne.

Target – A radar signal that shows the position of an airplane.

Taxi – To move an airplane slowly on the ground before takeoff or after landing.

Taxiway – A paved strip on the airport that links the airplane parking areas and the runways.

Terminal Facility – A facility located on the airport where tower controllers and radar approach controllers work.

Tower Cab – Glass enclosed room on top of the airport tower.

Tower Controller - A person who communicates with a pilot, usually by radio, directing the movement of aircraft taking off or landing at an airport.

TRACON – Radar rooms which are located either at the base of the tower or in a building completely separate from the airport where departing and approaching aircraft are controlled.

Turbulence – A disturbance or uneven flow of air that causes an airplane to bounce in flight.

Wheel Wells – The part of the airplane that stores the landing gear after it retracts.

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