

FLIGHT SIMULATION

v5.0 "GRADING SHEET"

NAME: _____
Partner: _____
Period: _____
Rotation: _____

MODULE GRADE: WORKBOOK _____ }
POST TEST _____ } **MODULE AVERAGE=** _____

FLIGHT SIMULATION "WORKSHEET" **TOTAL=** _____

DAILY LAB PERFORMANCE: _____
 (If you are absent, write ABS on the line for the day you miss and discuss what you need to make up with the teacher)
LAB PERFORMANCE TOTAL= _____

Extra Credit—Discuss this with the instructor before beginning!!!
 WORD SEARCH _____(5) CHALLENGES _____(5)
 MODULE REPORT _____(5) **MODULE NOTES** _____(10)
TOTAL EXTRA CREDIT= _____
BONUS POINTS *** _____

FLIGHT SIMULATION "WORKSHEET"

LESSON 1- Don't spend more that 5-10 flying per day or you will not finish this module!!!!

LESSON 2- Get the balsa plane from the teacher.
INSTRUMENT PANEL QUIZ: Explain the parts of the instrument panel to the instructor. **T.I.:** _____(10)

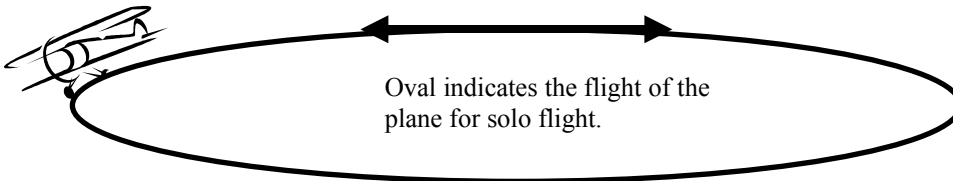
LESSON 3- How do you steer the plane when it is on the runway? _____
 Discuss with the instructor how to "Bend" the tips of the wings up. **T.I.:** _____

LESSON 4-Environmental Impacts: Write notes from video clips. **Env. Impacts Paper:** _____(5)

LESSON 5 TURNING LESSON- Show/ demonstrate the "Bank Angle" turn. **T.I.:** _____

LESSON 6 Balsa Airplane- Show the instructor the completed plane. **Balsa Plane Grade:** _____(20)
 "Model Airplane Status Report" Worksheet **Worksheet:** _____

LESSON 7 Solo Flight Needs to be shown to the Teacher today. **T.I.:** _____
 See the directions that are posted at your module (on the left).



Career Guidance- Write a paper describing the two top career choices. **C.G. Paper:** _____(10)
STUDY GUIDE- Turned In. **Study Guide:** _____(5)

Worksheet Total: _____

“Model Airplane Test” Worksheet

Go to the **Lobby** and fly your plane starting **near the office counter and fly toward the Gym doors**. You can also use the gym if no classes are in there.

Wind your airplane clockwise, 50 revolutions.

Launch your airplane by gently passing it forward as you release the propeller.

How far did your airplane fly? _____ ft.

Wind your airplane more tightly, 75 revolutions.

How far did your airplane fly? _____ ft.

Wind your airplane more tightly, 150 revolutions.

How far did your airplane fly? _____ ft.

Adjust both “**ELEVATORS**” in an **upward** position. **Wind the propeller approximately 75-100** revolutions.

What change did it make in its’ flight? _____

Adjust both “**ELEVATORS**” in a **downward** position.

What change did it make in its’ flight? _____

(return the elevators to a normal position)

Change your “**RUDDER**” to a **left** position (from the **pilots perspective**). How did it change the flight path?

Change your “**RUDDER**” to a **right** position (from the **pilots perspective**). How did it change the flight path?

(return the rudder to the normal position)

Change your “**AILERONS**” position (one up and one down). How did it affect the flight.

Change the elevator, rudder and flaps to any position and wind the propeller as much as you want, trying to **make the plane fly as far as possible**. Also try using the plane as a glider by removing the propeller and rubber band. Return to class in time for clean up.

Record the **longest** flight with the propeller: _____ feet. Meters _____.

Record the **longest** flight without the propeller: _____ feet. Meters _____.

(The conversion of feet to meters is: 1 ft. X 0.3048 = _____ meters)

Worksheet Total: _____ (10 pts.)



FLIGHT SIMULATION

STUDY GUIDE v6.0

Circle the correct answers as you progress through each lesson. You may use this guide on the Post Test.

1. The front of an airplane is called the 1-Parts of an Airplane.
face *nose* *beginning* *extension*
2. The cockpit is contained within the _____ of the plane.
fuselage *aileron* *confines* *top*
3. The pilot controls the aircraft from the 1-Parts of an Airplane.
fuselage *cockpit* *control tower* *ground*
4. The wings are approximately as long as the 1-Parts of an Airplane.
tail *elevators* *ailerons* *fuselage*
5. The wheels at the bottom of the plane are known as the 1-Parts of an Airplane.
rubber *tires* *pontoons* *landing gear*
6. A plane flies because of 1-Parts of an Airplane that pushes up on the wings.
Current *Air* *Lift* *Speed*
7. The ailerons are located 1-Parts of an Airplane.
on the rudder *near the elevator* *on the tail* *near the wing tip*
8. Ailerons are used to 1-Parts of an Airplane the airplane.
roll *turn* *back up* *throttle*
9. The function of the flaps is to slow the plane down during landing and provide 1-Parts of an Airplane in flight.
information *stability* *speed* *lift*
10. The two control surfaces on the tail are the elevator and the 1-Parts of an Airplane.
rudder *pitch* *ailerons* *flaps*
11. The rudder controls the side-to-side motion of the airplane known as 1-Parts of an Airplane.
pitch *yaw* *roll* *dive*
12. The yoke of an aircraft is very similar to 2-Flight Control.
rudder pedals *ailerons* *auto drive shafts* *a steering wheel*
13. On a real airplane, the brakes are located on the 2-Flight Control.
throttle *floor of the cockpit* *yoke* *instrument console*
14. The elevator, ailerons, and sometimes the rudder are controlled by the 2-Flight Control.
throttle *cockpit* *yoke* *flaps*
15. When the yoke is pushed away from the pilot, the aircraft pitches 2-Flight Control.
down *up* *to the right* *to the left*

16. On the flight simulator, pushing the left rudder pedal forward causes the aircraft to 2-Flight Control.
yaw to the right yaw to the left roll to the right roll to the left
17. The aircraft's speed is controlled by the 2-Flight Control.
wing shape ailerons throttle flaps
18. During straight and level flight, the altimeter should 2-Instrument Panel.
act erratic hold steady move clockwise move counterclockwise
19. The 2-Flight Control tells the pilot how high the airplane is.
altimeter vertical indicator gyro horizontal indicator
20. As the pilot lowers the nose of the airplane to land, he/she watches the 2-Instrument Panel to assist him/her.
ailerons fuel gage attitude indicator landing gear
21. Taxiing an airplane means 3-Taxiing on the ground.
commuting driving the airplane parking warming up the plane
22. Taxiing an airplane can be quite 3-Taxiing.
difficult easy unorthodox mind-boggling
23. When taxiing, the pilot steers the plane with the 3-Taxiing.
rudder pedals ailerons yoke elevators
24. To take off after properly positioning the aircraft, you would apply power, release the brakes, accelerate down the runway, obtain takeoff speed, 3-Review, and become airborne.
press the rudders move the yoke forward check for fuel pull back on the yoke
25. The four forces affecting an aircraft in flight are lift, weight, thrust, and 5-Flying.
strain stress drag equilibrium
26. An aircraft must overcome 5-Flying in order to fly through head winds.
drag lift thrust weight
27. For a plane to accelerate, the force of 5-Flying must be increased.
weight lift drag thrust
28. In straight and level flight, the lift equals the 5-Landing of the airplane.
weight size drag thrust
29. The most difficult and dangerous part of flying is 6-Landing.
Takeoff Climbing Diving Landing
30. As the aircraft touches down for a landing, the pilot applies the brakes and 6-Landing.
checks the fuel looks for the hangar brings up the flaps congratulates himself/herself

Flight Simulation

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

AILERON
AIRPLANE
ALTIMETER
BANK-ANGLE
COCKPIT
COMPASS
DIRIGIBLE
ELEVATOR
FLAPS

FLIGHT-SCHOOL
FUSELAGE
GROUND-SCHOOL
HEADING
HELICOPTER
HORIZON
LANDING
NOSE

PITCH
ROLL
RUDDER
THROTTLE
WING
WRIGHT
YAW
YOKE

Tech-Design by Lab Volt

Flight Simulation

Flight Simulation Table of Contents

Introduction	1
Directions.....	3
Flight Simulation – Beginning Level	3
Lesson 1, Introduction Flight	3
Lesson 2, Flying the Plane	4
Lesson 3, Taxiing	6
Lesson 4, Takeoff	7
Lesson 5, Straight and Level Flight	8
Lesson 6, Landing	9
Lesson 7, Solo Flight	10
Flight Simulation – Advanced Level	11
Lesson 1, Basic Flight Maneuvers.....	11
Lesson 4, How to Perform a Stall	13
Lesson 5, How to Perform a Spin	14
Lesson 6, How to Perform a Slip	15
Lesson 7, Practicing New Maneuvers	16
Lesson 8, Practicing the Maneuvers.....	18
Flight Simulation – Comprehensive Level.....	19
Lesson 1, Introduction Flight	19
Lesson 2, Flying the Plane	20
Lesson 3, Taxiing	22
Lesson 3, Takeoff	23
Lesson 4, Straight and Level Flight	24
Lesson 5, Landing	25
Lesson 7, How to Perform a Stall	26
Lesson 8, Plane Maneuvers	27
Lesson 9, Practicing New Maneuvers	29
Lesson 10, Practicing the Maneuvers.....	31
Variable/Challenges.....	32
Changing to Another Airport	32
Display Dynamic Scenery.....	33
Flight Simulator Challenges.....	34
Most Frequently Used Key Commands.....	35

Flight Simulation – Beginning Level

8-7-2007

Lesson 1

Introduction Flight

Note: The first class period of the day that has this module will open the Flight Simulator 2002 software. The other classes will find the software minimized. This will alter the directions slightly for each lesson.

1. Click on the **Application Launch** button and select the flight simulation software. If the software displays a "**FS 2002-End User License Agreement**" box, click the "**Accept**" button. If this box doesn't appear just continue to step 2 below.
2. Click on the word "**Welcome**" on the left hand side of the Microsoft Flight Simulator 2002 screen.
3. Click on the "**Getting Started**" button. Then, click on the "**Next**" button
4. Click on the "**Next**" button again.
5. You are now at the Flight Instruments screen. At the top it should say "**Getting Started Flight Instruments**". If it doesn't say this, you need to find it or see the instructor. You will now learn about the flight instruments used throughout this module. Click on the "**play**" button (underneath the black box). Watch a video about two of the instruments. When you are finished watching the video, you will click on the "**Next**" button at the lower right side of the monitor.
6. You are now ready to take your introductory flight. Click on the **Play** button to watch a video to meet your instructor. The video takes about 2:00 minutes. When you are finished watching the video, click on **Fly Now!** The introductory lesson with the flight instructor in control will start. **Follow his instructions**. Make sure the speakers are on and the volume is loud enough to hear the instructor. The instructor will have control at first and give you some instructions. After a while he will give you the controls. Don't worry that you don't know how to fly the plane yet, this is just to have some fun. Take turns with your partner. DO NOT spend more than 5-10 minutes flying per day.
7. All classes will just minimize the software, DO NOT CLOSE IT UNLESS, if this is the last period of the day that will use this module you will do the next step (8). You will have to ask the teacher if you are the last group. The last group will close the software. [The other classes will just press the **ALT** key and then minimize the software.]
8. When you are done flying, press the **Esc** button on your keyboard. Select **End Flight**. Press the **Esc** button again to **exit** the flight simulation program. Select **Yes**.

Go to the next section in the presentation in your Lab Volt lesson.

Lesson 2: Flying the Plane

CHECK

Before each and every flight, a pilot must check his/her airplane to make sure everything is working properly.

1. Click on the **Application Launch** button and select the flight simulation software.
2. Click on **Select a Flight** on the left hand side of the Microsoft Flight Simulator screen.
3. From the **Select a Flight** screen, under the **1**, where it says: **Choose a category**, scroll down to the bottom and click on **Other**. Under the **#2** where it says: **Choose a flight**: list, click on **Default-Meigs Field**. Click on **Fly Now!** Wait while the software loads. If the plane starts to take off, press the “P” key on the keyboard to pause the software.
4. (This is a very important step to remember for use of the software throughout the module) If you are in the full-screen mode (no menus or taskbar are visible at the top), **press the ALT key** on the keyboard to view the menu bar at the top of the screen. Try that now.
5. From the **Main Menu**, click on **Views**, then select **View Mode**, and click on **Tower**. You should see a view of the plane from the control tower. In the future, you can use the red buttons on the left side of the yoke handle. Where the two red buttons are, the top one will switch views like you just did using the taskbar. Try pressing the top red button and switch views several times until you get back to the tower view.
6. Press the + and - keys on the keyboard (NOT the keypad) to zoom in and out.
7. Zoom in to the plane so that you can see the control surfaces (ailerons, rudder, etc.)
8. When you see the plane up close, pull on the yoke and turn the rudder pedals with your feet. You should be able to see the control surfaces move when you move the controls. Make sure everything works properly.
9. Turn the **yoke** to the left and make sure the ailerons work.
10. Turn the **yoke** to the right and make sure the ailerons work.
11. Pull **back** on the yoke and make sure the elevator responds.
12. Push **forward** on the yoke and make sure the elevator responds.
13. Push the rudder pedals to the **left** and make sure the rudder responds.
14. Push the rudder pedals to the **right** and make sure the rudder responds.
15. Press the **ALT** key to display the menu bar if you are in full-screen mode. From the **Main Menu**, click on **Views**, **View Mode**, and then on **Cockpit**. You will see the instrument panel and will be looking down the runway.

16. On the right handle of the yoke, at the top there is a multi-directional switch. Moving this to the left allows you to see out of the left window. Moving it to the right allows you to see out the right window. Moving it back allows you to see behind you. You can move this button in any direction to see out the various windows of the plane.

17. On the two pages are some informational sheets that will help you with some of the keystrokes that are shortcuts and you don't always have to go to the menu at the top.

18. **Observe** the instrument panel. Locate and become familiar with the following instruments and controls. **HINT**: Place your cursor over an instrument for its name.

Airspeed Indicator

Turn Coordinator

Throttle Control

Attitude Indicator

Heading Indicator

Vertical Speed Indicator

Elevator Position Indicator

Tachometer

Flap Lever and Position Indicator

ADF Indicator

On the next page (yellow) you will find some short cuts. You can use various keys on the keyboard so you don't have to always go to the menu bar.

FLYING THE PLANE

HAVE MR. RODDA SHOW YOU HOW TO USE SOME OF THE FLIGHT CONTROLS NOW!!!!

1. On the rudder pedals, pressing your toes down to put on the brakes. Press on your heels will take off the brakes. Try taking off and flying the plane. Start by moving the throttle forward, and watch the engine RPM increase in the Tachometer.

2. Release the brakes by pressing the period (.) key. **You can also release the brakes by pressing the heels of the rudder pedals.** Steer the plane using the rudder pedals. If you press down on the rudder pedals with your toes, this will apply the brakes.

3. When the plane reaches about **60 knots** per hour, **pull back on the yoke** to allow the plane to become airborne. Keep the nose up and the wings level. Observe the attitude indicator.

4. When you reach about 1500 feet, start making a right 180 degree turn. Level off at about 2500 feet. Observe and become familiar with the flight instruments, and enjoy the thrill of flying.

5. When you are done flying, press the **ALT** key on the keyboard to get the menu bar to show.

6. If you are the **NOT** the last period of the day you will minimize the software, press ESC key and then END FLIGHT. If you **ARE** the last period of the day, then select **Flights** (from the Main Menu) and then **Exit**. Click on **Yes** to exit the flight simulator. Remember, you need to press the **ALT** key to view the menu bar if you are in full-screen mode. Go to the next section in the presentation.

Lesson 3: Taxiing

Normally, before every practice session, you would check the plane. However, to give you more time to practice controlling the plane and flying with the flight simulator, you will skip the check until you make your solo flight in Lesson 7.

1. Click on the **Application Launch** button and select the flight simulation software.
2. Click on **Select a Flight** on the left hand side of the Microsoft Flight Simulator screen.
3. From the **Select a Flight** screen, under the section #1 where it says: “**Choose a Category**” scroll to the bottom and click on “**Other**”. Under the heading #2 where it says: “**Choose a Flight**”, click on **Default Flight-Meigs Field**. Then at the bottom right, click on **Fly Now!** Wait while the software loads. If the plane starts to take off before you can read these directions, press the “P” key to **Pause** the software.

If you are in the full screen mode meaning there is no task bar visible at the top, Press the “ALT” key on the keyboard to view the menu bar at the top. This is something very helpful now and in the future.

The tower is permitting you to **practice taxiing** on the runway.

1. Begin by releasing the brakes. To do this, press on the heels of the rudder pedals. Or, you can press the period (.) key.
2. Push the throttle forward, **slightly**, you don't need full throttle. Only use enough throttle to make the airplane start to move.
3. Once the airplane is moving, use the **throttle to control your taxi speed**. Be careful not to taxi too fast.
4. Use the **rudder pedals** to “**steer**” the airplane left and right. Push on the left pedal to go left and on the right pedal to go right.
5. Try maneuvering the airplane left and right, while staying on the runway center line.
6. As you approach the end of the runway, reduce your throttle and apply the brakes by pushing on the front of the rudder pedals. Bring the airplane to a complete stop. **You DO NOT take off today.**
7. If you want to continue practice taxiing today, click on **Flights** and then **Reset Flight**. Remember, if you are in full-screen mode you must press the **ALT** key to view the menu bar.
8. When you are finished practicing minimize the software press ESC key and END FLIGHT. If you are the last group that has this module, click on **Flights** and then **Exit**. Select **Yes** to exit the flight simulator.

Go to the next section in the Lab Volt software presentation.

Lesson 4: Takeoff

1. Click on the **Application Launch** button and select the flight simulation software.
2. From the list on the left side of the screen, click on **Select a Flight.**
3. From the **Select a Flight** screen, under the section #1 where it says: “**Choose a Category**” scroll to the bottom and click on “**Other**”. Under the heading #2 , where it says: “**Choose a Flight**”, click on “**Default Flight – Meigs Field**”. Then at the bottom right, click on “**Fly Now!**”. Wait while the software loads. If the plane starts to take off before you can read these directions **press the”P” key** to Pause the software.
4. Increase the engine RPM to maximum by pushing the throttle completely forward.
5. Release the parking brakes (press on your heels) to start the plane moving down the runway.
6. Keep the plane in the center of the runway by steering it with the rudder pedals.
7. When the plane reaches takeoff velocity (around 60 to 70 knots), pull back **gently** on the yoke. If you pull back too far, you will stall the plane. The plane will become airborne because the force of lift will overcome the plane's weight.
8. When airborne, keep the wings of the plane level and the nose above the horizon.
9. At an altitude of about 1000 feet, practice maneuvering the plane using the yoke and rudder pedals.
10. When you are done flying, exit the flight simulator by selecting **ALT, END FLIGHT.** Minimize the software unless you are the last class of the day. Last class will close Flight Simulator.

Go to the next section in the presentation.

Lesson 5, Straight and Level Flight

1. Click on the *Application Launch* button and select the flight simulation software.
 2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
 3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
 4. Increase the engine RPM to maximum by pushing the throttle completely forward.
 5. Release the parking brakes to start the plane moving down the runway.
 6. Keep the plane in the center of the runway by steering it with the rudder pedals.
 7. When the plane reaches takeoff velocity (around 60 to 70 knots), pull back gently on the yoke. The plane will become airborne because the force of lift will overcome the plane's weight.
 8. Climb to an altitude of 1500 feet. As you approach 1500 feet, you want to lower the nose to stop the plane from climbing. Be careful not to lower the nose too far; you do not want to descend.
 9. Using the yoke, make small adjustments to maintain 1500 feet.
 10. When you are level, you must keep the airplane straight. Do this by using your yoke to keep the wings level.
 11. At an altitude of about 1500 feet, practice maneuvering the plane. You will do this by using the yoke. Then try using the rudder pedals.
 12. Then try making a ***bank angle turn*** using both the rudder pedals and the yoke together. As you turn the yoke right you should press the right rudder pedal forward. When you are turning left with the yoke, you should press the left rudder pedal forward. DO NOT turn to where the attitude indicator is past the second white marker.
11. All classes will do these steps: when you are comfortable flying straight and level, press the ***ALT*** key to view the menu bar (if you are full-screen mode). Select ***Flights*** and then ***End Flight***. Click on the ***End Flight*** button. The ***Select a Flight*** screen appears. Click on ***Flying Lessons*** on the left hand side of the screen. The ***Flying Lessons*** screen appears.
12. Under the *1. Choose a category:* list, select ***Student Pilot***. Under the *2. Choose a lesson:* list, select ***Lesson 2: Turns***.
 13. Read the lesson description and then click on ***Fly This Lesson Now***. Read the flight briefing and click on ***Fly This Lesson Now***.
 14. The instructor will give you instructions. Try your best.

15. When you are finished practicing minimize the software by pressing the ESC key and then END FLIGHT. If you are the last group that has this module, click on ***Flights*** and then ***Exit***. Select ***Yes*** to exit the flight simulator.

Go to the next section in the presentation.

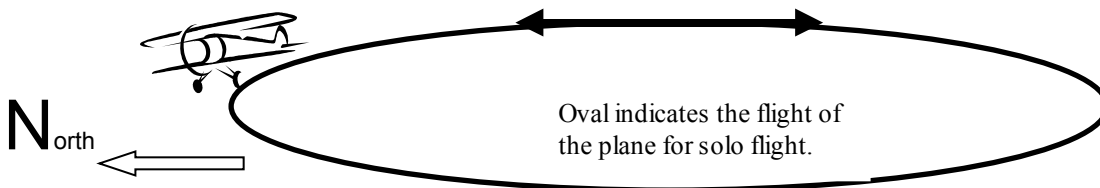
Lesson 6, Landing

1. Click on the **Application Launch** button and select the flight simulation software.
2. Click on **Flying Lessons** on the left hand side of the Microsoft Flight Simulator screen.
3. Under **Student Pilot** select **Lesson 6: Landings**.
4. Read the lesson description and then click on **Fly This Lesson Now**. Read the flight briefing and click on **Fly Part 1 of This Lesson Now**. When you are finished go back and select **Fly Part 2 of This Lesson Now**.
5. Follow your instructor's instructions and have fun. Try to fly through the yellow circles. The object is not to make major adjustments to get through the circles, the objective is to make minor changes. Look for and aim for about the third circle ahead. Don't always try to make it through the circle just in front of you.
6. When you are finished press the ESC key and END FLIGHT. If you are the last group of the day at this module, select **Flights** and then **Exit**. Click on **Yes** to exit the flight simulator. If you are any of the other classes, just minimize the software.

Go to the next section in the Lab Volt presentation.

Lesson 7, Solo Flight

1. Click on the **Application Launch** button and select the flight simulation software.
2. Click on **Select a Flight** on the left hand side of the Microsoft Flight Simulator screen.
3. From the **Select a Flight** screen, under the **1**, where it says: **Choose a category**, scroll down to the bottom and click on **Other**. Under the #2 where it says: **Choose a flight**: list, click on **Default-Meigs Field**. Click on **Fly Now!** Wait while the software loads.
4. Perform a check to make sure everything is working properly. After you have performed the check, you are ready for your first solo flight.



Read the directions below and practice your solo flight.
When you are ready, call the teacher over and tell him you are ready to begin the solo flight.

When you do your solo flight test, you are attempting to take off and make a **big oval**. You will land the plane going the same direction as you took off. You should touch down your landing about where you took off.

You and your partner will **split this solo flight in half** (to save time). One partner will make the first half of the oval and the other partner will do the second half of the oval.

One partner will taxi down the runway and take off, get the plane up in the air to about 1500 feet and then make a left turn going around the tall buildings of Chicago and fly south for about half of the oval. Then the other partner will take over and continue. This partner will continue flying south far enough past the runway to give them room to make a left hand turn, make their decent and then land the plane on the runway.

5. Begin by **taking off** and maintain a **heading of 0°** (north).
6. When you reach an altitude of 1500 feet, start **making a wide 180°** left turn to a heading of 180° (south). You will be flying over downtown Chicago. Be sure to avoid any skyscrapers!
7. Maintain an altitude of 1500 feet and heading south (180°). When the first partner has completed the first half of the oval, switch places with the other partner.
8. The second partner will fly south until you are **several miles south** of the city and Meigs Field. Then start a **90° left turn to a heading of 90°** (east).

8. When the runway of Meigs Field is **90° to your left**, start making a 90° left turn to the north (0°) in the direction of the runway.

9. Start your landing approach by **reducing airspeed to 70 knots per hour**, lowering the landing gear, and gradually lowering the flaps.

10. Keep the beginning of the runway in the center of the windshield. **When you are about 15 feet above the runway, slowly pull back on the yoke to stall the plane** into a smooth landing. Reduce the throttle completely.

11. Keep the plane in the center of the runway, apply brakes, and bring up the flaps.

If you crash you will get partial credit on the Worksheet, if you pass, you will get a stamp.

12. When you are done press the ESC key and then END FLIGHT. If you are the last period of the day, click on the ALT key and then exit.

Go to the next section in the presentation.

Flight Simulation – Advanced Level

Lesson 1, Basic Flight Maneuvers

CHECK

Before each and every flight, a pilot must check his/her airplane to make sure everything is working properly. Follow the directions below and takeoff will be a snap.

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. From the *Main Menu*, click on *Views*, then click on *View Mode*, and finally click on *Tower*. You should see a view of the plane from the control tower.
7. Press the + and - keys on the keyboard (NOT the keypad) to zoom in and out.
8. Zoom in to the plane so that you can see the control surfaces (ailerons, rudder, etc.)
9. When you see the plane up close, pull on the yoke and turn the rudder pedals with your feet. You should be able to see the control surfaces move when you move the controls. Make sure everything works properly.

Turn the yoke to the left and make sure the ailerons respond.

Turn the yoke to the right and make sure the ailerons respond.

Pull back on the yoke and make sure the elevator responds.

Push forward on the yoke and make sure the elevator responds.

Push the rudder pedals to the left and make sure the rudder responds.

Push the rudder pedals to the right and make sure the rudder responds.

10. From the *Main Menu*, click on *Views*, *View Mode*, and then on *Cockpit*. You will see the instrument panel and will be looking down the runway.

Flight Simulation Directions

12 Module Guide

Practicing Basic Maneuvers

Try out the controls of the airplane. See what you can do. If you crash, don't worry; you'll get better at flying every day. Just select *Flights* and then *Reset Flight* from the *Main Menu*.

TAXIING

To practice taxiing, press the red buttons on the yoke to release the brakes. Then push the throttle up until the airplane just begins to move. Don't push the throttle too far forward, or you might lose control of the airplane even before you get off the ground. Now use the rudder pedals to steer the plane along the ground. You may have some difficulty at first. Don't worry; practice is what flight simulation is all about.

TAKING OFF

To practice taking off, just push the throttle forward until you reach a speed of 60 knots. Then pull back on the yoke gently.

FLYING STRAIGHT AND LEVEL

To practice straight and level flight, try to keep the attitude indicator straight and level. That means no banking, no climbing, and no descending. The lines on the indicator should match up. This also applies to the turn coordinator. Try to keep it lined up with the straight line marks on the dial. This might be difficult, so take

your time.

LANDING

To practice landing, start descending by reducing the throttle slightly and lowering the nose (until it falls slightly below the horizon). Use your attitude indicator to help you. Also, your altimeter should start to drop.

As you approach the airport, press the *G* key to let down your landing gear. Then press the *F7* key to bring the flaps down a little bit. As you get closer to the runway (your air speed should be approximately 70 knots). When landing is assured, press the *F8* key to bring the flaps down all the way.

Gently steer the airplane so that the nose of the airplane lines up with the center of the runway.

Just before the airplane is about to touch down, reduce the throttle completely, and pull the nose up by pulling the yoke toward you.

When the airplane touches down, press the *F5* key to bring up the flaps, and press the red buttons on the yoke to apply the brakes. Congratulations! You have just landed.

When you are finished reviewing the basic flight maneuvers, select *Flights* and then *Exit*. Click on *Yes* to exit the flight simulator.

Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 13

Lesson 4, How to Perform a Stall

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.

Stalling is common for beginner pilots. A simple stall is usually not dangerous; however, it can lead to more serious problems in maneuvering the aircraft. Soon, pulling into and out of stalls will become second nature to you.

6. Fly to an altitude of 3000 feet or more.
7. Pull back the throttle to idle.
8. Pull back slowly on the yoke until you see that the aircraft is stalled.

HOW TO RECOVER FROM A STALL

1. Push forward on the yoke to bring the aircraft out of a stall.
2. Push the throttle forward to increase speed.
3. Return the airplane to straight and level flight.
4. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*.

Go to the next section in the presentation.

Flight Simulation Directions

14 Module Guide

Lesson 5, How to Perform a Spin

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.

5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. Fly to an altitude of 6000 feet or more.
7. Pull back the throttle to idle.
8. Pull back slowly on the yoke until you see that the plane is about to stall.
9. As you begin to stall, pull back on the stick and turn the rudder pedals to the left or to the right. The aircraft will begin to spin and fall to the ground.

HOW TO RECOVER FROM A SPIN

1. Turn the rudder in the OPPOSITE direction that you turned it to cause the spin.
2. Push forward on the yoke to bring the plane out of a stall.
3. As you stop spinning, ease up on the rudder.
4. Gently pull back on the yoke to resume straight and level flying.
5. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 15

Lesson 6, How to Perform a Slip

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. Fly to an altitude of 2000 feet or more.
7. Turn the rudder all the way to the left or to the right. Notice that the plane is not flying in the direction of the nose.

HOW TO RECOVER FROM A SLIP

Turn the rudder in the OPPOSITE direction that caused the slip.

HOW TO PERFORM A LOOP-THE-LOOP

1. Fly to an altitude of 6000 feet or more.
2. Push forward on the yoke into a nose dive. Keep diving until you reach 200 knots on the airspeed indicator.
3. Pull up steadily by pulling back on the yoke.
4. When you see blue sky out of the windshield, apply full throttle.
5. When the loop is 3/4 of the way through, bring the throttle back to idle.

HOW TO RECOVER FROM A LOOP-THE-LOOP

1. As you begin to see the horizon, level off and push the throttle up to cruise speed.
2. Practice slips and loop-the-loops.
3. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

16 Module Guide

Lesson 7, Practicing New Maneuvers

HOW TO PERFORM AN AILERON ROLL

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key

- to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
 6. Increase your speed to 30 knots above cruise speed.
 7. Pull back on the yoke until the nose of the airplane is slightly above the horizon.
 8. Release the pitch by allowing the yoke to return to the neutral position. Then apply the ailerons by turning the yoke the way you want the aircraft to roll.

HOW TO RECOVER FROM AN AILERON ROLL

1. Just before the plane is in level flight, apply the ailerons in the opposite direction that you did to begin the roll.
2. Level the plane out and continue to fly straight and level.

HOW TO FLY INVERTED

1. Begin an aileron roll.
2. As you roll past 90° (1/4 of a circle), let up on the ailerons.
3. As you roll to 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
4. Adjust the controls to obtain level, inverted flight.
5. To recover from inverted flight, simply repeat the steps you have just done until you roll another 180°.

Flight Simulation Directions
Module Guide 17

HOW TO PERFORM A SPLIT "S"

1. Begin an aileron roll.
2. As you roll past 90° (1/4 of a circle), let up on the ailerons.
3. As you roll 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
4. Adjust the controls to obtain level, inverted flight.
5. Pull back on the yoke and let up on the throttle.
6. As you begin to level out, pitch the nose back down to level flight and push the throttle back up to cruising speed.

HOW TO PERFORM AN IMMELMANN

1. Fly to an altitude of 6000 feet or more.
2. Push forward on the yoke into a nose dive. Keep diving until you reach 200 knots on the airspeed indicator.
3. Pull up steadily by pulling on the yoke.
4. When you see blue sky out of the windshield, apply full throttle.
5. Push the yoke in to drop the nose into level flight.
6. Begin an aileron roll.
7. As you roll past 90° (1/4 of a circle), let up on the ailerons.
8. As you roll past 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
9. Adjust the controls to obtain level flight.
10. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions
18 Module Guide

Lesson 8, Practicing the Maneuvers

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the 1. *Choose a category:* list, click on *Other*. Under the 2. *Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The

Aircraft model is Learjet 45. Click on OK.

7. Practice the maneuvers you learned in this module:

Stall

Spin

Slip

Loop-the-Loop

Aileron Roll

Inverted Flight

Split "S"

Immelmann

8. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 19

Flight Simulation – Comprehensive Level

Lesson 1, Introduction Flight

1. Click on the *Application Launch* button and select the flight simulation software. If the software does not launch, ask your instructor to insert Disc 4 into the DVD/CDROM drive.

2. The Getting Started screen appears. Click on *Introductory Flight*.

3. Click on the *Next* button until to you get to the *Flight Instruments* screen. You will learn all about the flight instruments throughout this module, but for now click on the *Play* button to watch a video about two of the instruments you will be using during your introductory flight. When you are finished watching the video, click on the *Next* button.

4. You are now ready to take your introductory flight. Click on the *Play* button to watch a video to meet your instructor. When you are finished watching the video, click on *Fly Now!* The introductory lesson with the flight instructor in control will start. Follow his instructions.

5. When you are done flying, press the Esc button on your keyboard. Select *End Flight*. Press the Esc button again to exit the flight simulation program. Select *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

20 Module Guide

Lesson 2, Flying the Plane

CHECK

Before each and every flight, a pilot must check his/her airplane to make sure everything is working properly.

1. Click on the *Application Launch* button and select the flight simulation software.

2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.

3. From the *Select a Flight* screen, under the 1. *Choose a category:* list, click on *Other*. Under the 2. *Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*

4. If you are in the full-screen mode (no menus or taskbar are visible), press the ALT key on the keyboard to view the menu bar.

5. From the *Main Menu*, click on *Views*, then select *View Mode*, and click on *Tower*. You should see a view of the plane from the control tower.

6. Press the + and - keys on the keyboard (NOT the keypad) to zoom in and out.

7. Zoom in to the plane so that you can see the control surfaces (ailerons, rudder, etc.)

8. When you see the plane up close, pull on the yoke and turn the rudder pedals with your feet. You should be able to see the control surfaces move when you move the controls. Make sure everything works properly.

9. Turn the yoke to the left and make sure the ailerons respond.
10. Turn the yoke to the right and make sure the ailerons respond.
11. Pull back on the yoke and make sure the elevator responds.
12. Push forward on the yoke and make sure the elevator responds.
13. Push the rudder pedals to the left and make sure the rudder responds.
14. Push the rudder pedals to the right and make sure the rudder responds.
15. Press the ALT key to display the menu bar if you are in full-screen mode. From the *Main Menu*, click on *Views*, *View Mode*, and then on *Cockpit*. You will see the instrument panel and will be looking down the runway.

Flight Simulation Directions

Module Guide 21

CHECK (CONTINUED)

16. Observe the instrument panel. Locate and become familiar with the following instruments and controls. **HINT:** Place your cursor over an instrument for its name.

Airspeed Indicator

Turn Coordinator

Throttle Control

Attitude Indicator

Heading Indicator

Vertical Speed Indicator

Elevator Position Indicator

Tachometer

Flap Lever and Position Indicator

ADF Indicator

FLYING THE PLANE

1. Try taking off and flying the plane. Start by moving the throttle forward, and watch the engine RPM increase in the tachometer.
2. Release the brakes by pressing the period (.) key.
3. When the plane reaches about 60 knots per hour, pull back on the yoke to allow the plane to become airborne. Keep the nose up and the wings level. Observe the attitude indicator.
4. When you reach about 1500 feet, start making a right 180° turn. Level off at about 2500 feet. Observe and become familiar with the flight instruments, and enjoy the thrill of flying.
5. When you are done flying, select *Flights* (from the Main Menu) and then *Exit*. Click on *Yes* to exit the flight simulator. Remember, you need to press the ALT key to view the menu bar if you are in full-screen mode.

Go to the next section in the presentation.

Flight Simulation Directions

22 Module Guide

Lesson 3, Taxiing

Normally, before every practice session, you would check the plane. However, to give you more time to practice controlling the plane and flying with the flight simulator, you will skip the check until you make your solo flight in a later lesson.

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*

The tower is permitting you to practice taxiing on the runway.

4. Begin by releasing the brakes. To do this, press the period (.) key.
5. Push the throttle forward, slightly, only enough to make the airplane start to move.
6. Once the airplane is moving, use the throttle to control your taxi speed. Be careful not to taxi too fast.
7. Use the rudder pedals to steer the airplane left and right. Push on the left pedal to go left and on the right pedal to go right.
8. Try maneuvering the airplane left and right, while staying on the runway center line.
9. As you approach the end of the runway, reduce your throttle and apply the brakes by pressing the right red button on the yoke. Bring the airplane to a complete stop.
10. When you are finished practicing, click on *Flights* and then *Exit*. Select *Yes* to exit the flight simulator.

Go to the next section in the presentation.

Flight Simulation Directions
Module Guide 23

Lesson 3, Takeoff

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. Increase the engine RPM to maximum by pushing the throttle completely forward.
5. Release the parking brakes to start the plane moving down the runway.
6. Keep the plane in the center of the runway by steering it with the rudder pedals.
7. When the plane reaches takeoff velocity (around 60 to 70 knots), pull back gently on the yoke. The plane will become airborne because the force of lift will overcome the plane's weight.
8. When airborne, keep the wings of the plane level and the nose above the horizon.
9. At an altitude of about 1000 feet, practice maneuvering the plane.
10. When you are done flying, exit the flight simulator by selecting *Flights* and then *Exit*. Click on *Yes*. Remember, if you are in full-screen mode you must press the ALT key to view the menu bar.

Go to the next section in the presentation.

Flight Simulation Directions
24 Module Guide

Lesson 4, Straight and Level Flight

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. Increase the engine RPM to maximum by pushing the throttle completely forward.
5. Release the parking brakes to start the plane moving down the runway.
6. Keep the plane in the center of the runway by steering it with the rudder pedals.
7. When the plane reaches takeoff velocity (around 60 to 70 knots), pull back gently on the yoke. The plane will become airborne because the force of lift will overcome the plane's weight.
8. Climb to an altitude of 1500 feet. As you approach 1500 feet, you want to lower the nose to stop the plane from climbing. Be careful not to lower the nose too far; you do not want to descend.
9. Using the yoke, make small adjustments to maintain 1500 feet.
10. When you are level, you must keep the airplane straight. Do this by using your yoke to keep the wings level.
11. When you are comfortable flying straight and level, Press the ALT key to view the menu bar (if you are full-screen mode). Select *Flights* and then *End Flight*. Click on

the *End Flight* button. The *Select a Flight* screen appears. Click on *Flying Lessons* on the left hand side of the screen. The *Flying Lessons* screen appears.

12. Under *Student Pilot* select *Lesson 2: Turns*.

13. Read the lesson description and then click on *Fly This Lesson Now*. Read the flight briefing and click on *Fly This Lesson Now*.

14. The instructor will give you instructions. Try your best.

15. Try your best. When you are finished, select *Flights* and then *Exit*. Click on *Yes* to exit the flight simulator. (If you are in the full-screen mode, you must press the ALT key to view the menu bar.)

Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 25

Lesson 5, Landing

1. Click on the *Application Launch* button and select the flight simulation software.

2. Click on *Flying Lessons* on the left hand side of the Microsoft Flight Simulator screen.

3. Under *Student Pilot* select *Lesson 6: Landings*.

4. Read the lesson description and then click on *Fly This Lesson Now*. Read the flight briefing and click on *Fly Part 1 of This Lesson Now*. When you are finished go back and click on *Fly Part 2 of This Lesson Now*.

5. Follow your instructor's instructions and have fun.

6. When you are finished, select *Flights* and then *Exit*. Click on *Yes* to exit the flight simulator.

Go to the next section in the presentation.

Flight Simulation Directions

26 Module Guide

Lesson 7, How to Perform a Stall

1. Click on the *Application Launch* button and select the flight simulation software.

2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.

3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*

4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.

5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on *OK*.

Stalling is common for beginner pilots. A simple stall is usually not dangerous; however, it can lead to more serious problems in maneuvering the aircraft. Soon, pulling into and out of stalls will become second nature to you.

6. Fly to an altitude of 3000 feet or more.

7. Pull back the throttle to idle.

8. Pull back slowly on the yoke until you see that the aircraft is stalled.

HOW TO RECOVER FROM A STALL

1. Push forward on the yoke to bring the aircraft out of a stall.

2. Push the throttle forward to increase speed.

3. Return the airplane to straight and level flight.

4. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*.

Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 27

Lesson 8, Plane Maneuvers

HOW TO PERFORM A SPIN

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. Fly to an altitude of 6000 feet or more.
7. Pull back the throttle to idle.
8. Pull back slowly on the yoke until you see that the plane is about to stall.
9. As you begin to stall, pull back on the stick and turn the rudder pedals to the left or to the right. The aircraft will begin to spin and fall to the ground.

HOW TO RECOVER FROM A SPIN

1. Turn the rudder in the OPPOSITE direction that you turned it to cause the spin.
2. Push forward on the yoke to bring the plane out of a stall.
3. As you stop spinning, ease up on the rudder.
4. Gently pull back on the yoke to resume straight and level flying.

HOW TO PERFORM A SLIP

1. Fly to an altitude of 2000 feet or more.
2. Turn the rudder all the way to the left or right. Notice that the plane is not flying in the direction of the nose.

HOW TO RECOVER FROM A SLIP

Turn the rudder in the OPPOSITE direction that caused the slip.

Flight Simulation Directions

28 Module Guide

HOW TO PERFORM A LOOP-THE-LOOP

1. Fly to an altitude of 6000 feet or more.
2. Push forward on the yoke into a nosedive. Keep diving until you reach 200 knots on the airspeed indicator.
3. Pull up steadily by pulling back on the yoke.
4. When you see blue sky out of the windshield, apply full throttle.
5. When the loop is 3/4 of the way through, bring the throttle back to idle.

HOW TO RECOVER FROM A LOOP-THE-LOOP

1. As you begin to see the horizon, level off and push the throttle up to cruise speed.
2. Practice slips and loop-the-loops.
3. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 29

Lesson 9, Practicing New Maneuvers

HOW TO PERFORM AN AILERON ROLL

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. Increase your speed to 30 knots above cruise speed.

7. Pull back on the yoke until the nose of the airplane is slightly above the horizon.
8. Release the pitch by allowing the yoke to return to the neutral position. Then apply the ailerons by turning the yoke the way you want the aircraft to roll.

HOW TO RECOVER FROM AN AILERON ROLL

1. Just before the plane is in level flight, apply the ailerons in the opposite direction that you did to begin the roll.
2. Level the plane out and continue to fly straight and level.

HOW TO FLY INVERTED

1. Begin an aileron roll.
2. As you roll past 90° (1/4 of a circle), let up on the ailerons.
3. As you roll to 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
4. Adjust the controls to obtain level, inverted flight.
5. To recover from inverted flight, simply repeat the steps you have just done until you roll another 180°.

Flight Simulation Directions

30 Module Guide

HOW TO PERFORM A SPLIT "S"

1. Begin an aileron roll.
2. As you roll past 90° (1/4 of a circle), let up on the ailerons.
3. As you roll 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
4. Adjust the controls to obtain level, inverted flight.
5. Pull back on the yoke and let up on the throttle.
6. As you begin to level out, pitch the nose back down to level flight and push the throttle back up to cruising speed.

HOW TO PERFORM AN IMMELMANN

1. Fly to an altitude of 6000 feet or more.
2. Push forward on the yoke into a nose dive. Keep diving until you reach 200 knots on the airspeed indicator.
3. Pull up steadily by pulling on the yoke.
4. When you see blue sky out of the windshield, apply full throttle.
5. Push the yoke in to drop the nose into level flight.
6. Begin an aileron roll.
7. As you roll past 90° (1/4 of a circle), let up on the ailerons.
8. As you roll past 180° (1/2 of a circle), stop rolling and push the yoke forward slightly.
9. Adjust the controls to obtain level flight.
10. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

Module Guide 31

Lesson 10, Practicing the Maneuvers

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the 1. *Choose a category:* list, click on *Other*. Under the 2. *Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. If you are in full-screen mode (no menus or task bar are visible), press the ALT key to view the menu bar. From the *Main Menu*, select *Aircraft* and then *Select Aircraft*.
5. Under *Aircraft manufacturer*, click on the down arrow and select *Bombardier*. The *Aircraft model* is *Learjet 45*. Click on OK.
6. Practice the maneuvers you learned in this module:

Stall

Spin

Slip
Loop-the-Loop
Aileron Roll
Inverted Flight
Split "S"
Immelmann

7. Exit the flight simulator by first selecting *Flights* and then *Exit*. Finally, click on *Yes*. Go to the next section in the presentation.

Flight Simulation Directions

32 Module Guide

Variable/Challenges

Changing to Another Airport

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Meigs Field*. Click on *Fly Now!*
4. Press the ALT key on the keyboard to view the menu bar if you are in full-screen mode. From the Main Menu, select *World* and then *Go To Airport*.
5. Choose an airport from the list or type an airport name in the box.
6. Click on OK. You are now ready to fly.
7. When you are finished, exit the flight simulator by selecting *Flights* (from the Main Menu) and then *Exit*. Click on *Yes*.

Flight Simulation Directions

Module Guide 33

Variable/Challenges (continued)

Display Dynamic Scenery

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the Microsoft Flight Simulator screen.
3. From the *Select a Flight* screen, under the *1. Choose a category:* list, click on *Other*. Under the *2. Choose a flight:* list, click on *Default Flight – Meigs Field*. Click on *Fly Now!*
4. Press the Esc key to exit the Flight Simulator program and select *End Flight*.
5. Click on Settings on the left hand side of the Flight Simulator screen. Click on *Scenery Library*.
6. Choose the Scenery Area.
7. Click on OK.
8. When you are finished, exit the flight simulator by selecting *Flights* (from the Main Menu) and then *Exit*. Click on *Yes*.

Flight Simulation Directions

34 Module Guide

Variable/Challenges (continued)

Flight Simulator Challenges

1. Click on the *Application Launch* button and select the flight simulation software.
2. Click on *Select a Flight* on the left hand side of the screen.
3. Under the *1. Choose a category:* list, click on the different choices and read the category descriptions for each. When you find a category you would like to try, select a flight from the *2. Choose a flight:* list.
4. Click on *Fly Now!* You are now ready to test your flying skills. Good luck!

When you are finished, exit the flight simulator by selecting *Flights* and then *Exit*. Click on *Yes*. (Remember to press the ALT key to view the menu bar if you are in full-screen

mode).

Flight Simulation Most Frequently used Key Commands

Module Guide 35

MOST FREQUENTLY USED KEY COMMANDS

Other Aircraft Commands (Num Lock OFF)

Set Parking Brake CTRL + . (PERIOD)

Apply/Release Brakes . (PERIOD)

Landing Gear Up/Down G

All Lights On/Off L

View Commands (Num Lock OFF)

Full Screen Mode (no menus of taskbar) ALT + ENTER

Display Menus (in Full Screen Mode) ALT

Panel On/Off W

Simulator Commands (Num Lock OFF)

Pause P

Sound On/Off Q

Reset Current Flight CTRL + ; (SEMICOLON)

Save Flight ; (SEMICOLON)

Exit Flight Simulator CTRL + C, or ALT + F4

Control Surface Commands (Num Lock OFF)

Bank Left (ailerons) Num Pad 4

Bank Right (ailerons) Num Pad 6

Yaw Left (rudder) Num Pad 0

Yaw Right (rudder) Num Pad ENTER

Retract Flaps (fully) F5

Retract Flaps (in increments) F6

Extend Flaps (in increments) F7

Extend Flaps (fully) F8