

SECTION 12**PO 231 – EXPLAIN PRINCIPLES OF FLIGHT**

1. **Performance:** Explain Principles of Flight
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Any conditions.
3. **Standard:** In accordance with specified references, the cadet will explain the principles of flight by:
 - a. identifying the four forces that act upon an aircraft;
 - b. describing the production of lift;
 - c. describing the types of drag;
 - d. describing aircraft axis movement; and
 - e. describing aircraft control surfaces.
4. **Remarks:** N/A.
5. **Complementary Material:**
 - a. Complementary material associated with PO 231 is designed to enhance the cadet's knowledge of principles of flight:
 - (1) EO C231.01 (Operate an Experimental Wing);
 - (2) EO C231.02 (Fly a Paper Colditz Glider);
 - (3) EO C231.03 (Tour a Flight School);
 - (4) EO C231.04 (Participate in a Presentation Given by a Guest Speaker from the Local Aviation Community);
 - (5) EO C231.05 (Tour a Flight Simulator); and
 - (6) EO C231.06 (Tour a Local Air Show).
 - b. Complementary training associated with PO 231 is limited to a total of 12 periods, which may be conducted during sessions or on a supported day. Squadrons are not required to use all 12 periods.

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EO M231.01 – IDENTIFY THE FOUR FORCES THAT ACT UPON AN AIRCRAFT

1. **Performance:** Identify the Four Forces That Act Upon an Aircraft
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, the cadet shall identify the four forces that act upon an aircraft, to include:
 - a. weight;
 - b. drag;
 - c. thrust; and
 - d. lift.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that every aircraft has weight and that a glider on tow gains energy as it gains altitude.	Interactive Lecture	5 min	C3-116 (p. 22, p. 34) C3-090
TP2	Explain that a glider experiences drag from the air as it returns to Earth after being released.	Interactive Lecture	5 min	C3-017 (p. 20)
TP3	Fold and fly a simple paper glider. Introduce Newton's first law of motion, "an object in motion tends to stay in motion", with regard to aircraft.	In-Class Activity	15 min	C3-058 C3-116 (p. 21)
TP4	Explain that a descending glider converts the energy of raised weight into forward thrust by acting upon the passing air.	Interactive Lecture	10 min	C3-116 (p. 23) C3-017 (p. 21)
TP5	Explain that a glider's wings are designed to convert the energy of the glider's descent from downward motion to lift.	Interactive Lecture	5 min	C3-017 (p. 20)
TP6	Explain that a powered aircraft has weight and, when in flight, also experiences: <ol style="list-style-type: none"> a. drag; b. thrust; and c. lift. 	Interactive Lecture	10 min	C3-116 (p. 22)

TP	Description	Method	Time	Refs
TP7	Explain that thrust and lift allow an aircraft to fly by overcoming drag and weight.	Interactive Lecture	5 min	C3-116 (p. 21)

5. **Time:**

- | | | |
|----|----------------------------|--------|
| a. | Introduction / Conclusion: | 5 min |
| b. | Interactive Lecture: | 40 min |
| c. | In-Class Activity: | 15 min |
| d. | Total: | 60 min |

6. **Substantiation:**

- An interactive lecture was chosen for TP1 and TP2 and TP4 to TP7 to introduce the forces that act on an aircraft and give an overview of them.
- An in-class activity was chosen for TP3 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References:**

- C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders*. New York, NY: Sterling Publishing.
- C3-058 (ISBN 1-4027-3034-9) Schmidt, N. (2005). *Paper Creations Paper Airplanes*. New York, NY: Sterling Publishing.
- C3-090 National Aeronautics and Space Administration (NASA). (2007). *Virtual Skies*. Retrieved 22 February 2007, from <http://virtualskies.arc.nasa.gov/aeronautics/tutorial/intro.html>
- C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Pepler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and
- Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail.

9. **Learning Aids:** 8.5 x 11 inch paper.10. **Test Details:** N/A.11. **Remarks:** It is recommended that the two periods required for this EO be scheduled consecutively.

EO M231.02 – DESCRIBE THE PRODUCTION OF LIFT BY AN AIRCRAFT WING

1. **Performance:** Describe the Production of Lift by an Aircraft Wing
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, the cadet shall describe the production of lift by an aircraft wing, to include:
 - a. the airfoil camber; and
 - b. angle of attack.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that air acts like a fluid insofar as it has: <ol style="list-style-type: none"> a. inertia; b. speed; and c. pressure. 	Interactive Lecture	5 min	C3-116 (p. 21)
TP2	Introduce Bernoulli's Principle, which states that a liquid's pressure drops when its speed increases (venturi effect).	Interactive Lecture	10 min	C3-116 (p. 22)
TP3	Have the cadets explore Bernoulli's Principle by blowing: <ol style="list-style-type: none"> a. over a curved sheet of paper; and b. between two suspended balloons. <p>Note: Explain that airfoil camber increases air speed above the wing, thereby reducing pressure; the venturi effect.</p>	In-Class Activity	10 min	C3-017 (p. 18) C3-116 (p. 26)
TP4	Introduce angle of attack. Explain that: <ol style="list-style-type: none"> a. when air particles encounter the wing, air pressure increases under the wing; and b. the greater the angle of attack and the greater the wing's speed, the more lift will be produced, until the wing stalls. 	Interactive Lecture	5 min	C3-116 (p. 22)

TP	Description	Method	Time	Refs
TP5	Have each cadet: a. create an airfoil from an index card; and b. experiment with lift using a fan or hair dryer to "fly" the airfoil from a "sting" launch pad.	In-Class Activity	25 min	C3-091 (p. 31)

5. **Time:**

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|-------------------------------|--------|
| a. Introduction / Conclusion: | 5 min |
| b. Interactive Lecture: | 20 min |
| c. In-Class Activity: | 35 min |
| d. Total: | 60 min |

6. **Substantiation:**

- An interactive lecture was chosen for TP1, TP2 and TP4 to introduce the production of lift and give an overview of it.
- An in-class activity was chosen for TP3 and TP5 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References:**

- C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders*. New York, NY: Sterling Publishing.
- C3-058 (ISBN 1-4027-3034-9) Schmidt, N. (2005). *Paper Creations Paper Airplanes*. New York, NY: Sterling Publishing.
- C3-091 (ISBN 1-55652-477-3) Carson, M. K. (2003). *The Wright Brothers for Kids: How They Invented the Airplane*. Chicago, IL: Chicago Review Press.
- C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Pepler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area;
- Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail; and
- Electric fan or hairdryer.

9. **Learning Aids:**

- Index cards;
- Tape;
- Hole punch or sharp pencil;
- Scissors;
- Plastic drinking straw;
- Bamboo skewers or large straightened paper clips;

- g. Styrofoam or corrugated cardboard;
 - h. Balloons; and
 - i. String.
10. **Test Details:** N/A.
11. **Remarks:** It is recommended that the two periods required for this EO be scheduled consecutively.

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EO M231.03 – DESCRIBE THE TYPES OF DRAG THAT ACT UPON AN AIRCRAFT

1. **Performance:** Describe the Types of Drag That Act Upon an Aircraft
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, the cadet shall describe the types of drag that act upon an aircraft, to include:
 - a. parasite drag; and
 - b. induced drag.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that drag is an important and useful force which allows a pilot to control the aircraft's flight. Introduce the two types of drag: <ol style="list-style-type: none"> a. parasite drag; and b. induced drag. 	Interactive Lecture	5 min	C3-116 (p. 23)
TP2	Define the components of parasite drag, including: <ol style="list-style-type: none"> a. form drag; and b. skin friction. 	Interactive Lecture	5 min	C3-116 (p. 23)
TP3	Demonstrate form drag.	In-Class Activity	15 min	C3-092 (p. 14)
TP4	Explain that induced drag results from aircraft parts which actively produce lift, such as wings and that both drag and lift increase with angle of attack.	Interactive Lecture	10 min	C3-116 (p. 23)
TP5	Conduct an activity to demonstrate induced drag.	In-Class Activity	20 min	C3-116 (p. 23)

5. **Time:**

a. Introduction / Conclusion:	5 min
b. Interactive Lecture:	20 min
c. In-Class Activity:	35 min
d. Total:	60 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1, TP2 and TP4 to introduce the subject of drag and give an overview of it.
- b. An in-class activity was chosen for TP3 and TP5 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References:**

- a. C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders*. New York, NY: Sterling Publishing.
- b. C3-058 (ISBN 1-4027-3034-9) Schmidt, N. (2005). *Paper Creations Paper Airplanes*. New York, NY: Sterling Publishing.
- c. C3-092 (ISBN 0-7460-0978-)X Edom, H., Butterfield, M., Heddle, R. and Unwin, M. (1992). *The Usborne Book of Science Activities: Volume Two*. Tulsa OK: EDC Publishing.
- d. C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Pepler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and
- b. Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail.

9. **Learning Aids:**

- a. 8.5 x 11 paper;
- b. Bristol board; and
- c. Tape.

10. **Test Details:** N/A.

11. **Remarks:** It is recommended that the two periods required for this EO be scheduled consecutively.

EO M231.04 – DESCRIBE THE AXIAL MOVEMENTS OF AN AIRCRAFT

1. **Performance:** Describe the Axial Movements of an Aircraft
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, the cadet shall describe the axial movements of an aircraft, to include:
 - a. the three axes of an aircraft; and
 - b. the three corresponding axial movements.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that aircraft operate in a three-dimensional space. Identify the three axes of aircraft movement, to include: <ol style="list-style-type: none"> a. the longitudinal axis; b. the lateral axis; and c. the vertical axis. 	Interactive Lecture	5 min	C3-116 (p. 30)
TP2	Using a model aircraft, describe the three movements that aircraft make around their three axes, to include: <ol style="list-style-type: none"> a. roll about the longitudinal axis; b. pitch about the lateral axis; and c. yaw about the vertical axis. 	Interactive Lecture	10 min	C3-116 (p. 30) C3-017 (p. 22)
TP3	Discuss movement that may take place about multiple axes simultaneously in a turn.	Group Discussion	5 min	C3-116 (pp. 34-35)
TP4	Have the cadets brainstorm how aircraft flight might be controlled. Note: Explain that the aircraft surfaces which control these movements will be covered in the next lesson.	Group Discussion	5 min	C3-116 (pp. 14-16)

5. **Time:**

a. Introduction / Conclusion:	5 min
b. Interactive Lecture:	15 min
c. Group Discussion:	10 min
d. Total:	30 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 and TP2 to introduce the subject of axial movement of an aircraft and give an overview of it.
- b. A group discussion was chosen for TP3 and TP4 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions, and feelings about axial movement of an aircraft.

7. **References:**

- a. C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders*. New York, NY: Sterling Publishing.
- b. C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Peppler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and
- b. Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail.

9. **Learning Aids:** N/A.

10. **Test Details:** N/A.

11. **Remarks:** N/A.

EO M231.05 – DESCRIBE AIRCRAFT CONTROL SURFACES

1. **Performance:** Describe Aircraft Control Surfaces
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with A-CR-CCP-263/PT-001, *From the Ground Up: Millennium Edition*, the cadet shall describe aircraft control surfaces, to include:
 - a. the location, operation and purpose of:
 - (1) empennage control surfaces;
 - (2) a main wing's control surfaces; and
 - (3) trim tabs; and
 - b. the method and purpose of balanced controls.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Identify the control surfaces of the empennage, to include: <ol style="list-style-type: none"> a. the horizontal/vertical stabilizers; b. the rudder; and c. the elevator. 	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP2	Explain how stabilizers reduce unwanted axial movement.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP3	Explain that the rudder rotates the aircraft about its vertical (yaw) axis by pushing the tail to either left or right.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP4	Explain that the elevator rotates the aircraft about its lateral (pitch) axis by pushing the tail up or down.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP5	Describe the cockpit controls that move the associated empennage control surfaces. Have the cadets enact control movements with a “pilot” calling out pedal and stick movements to the remainder of the class, who then act as pitch and yaw control surfaces.	In-Class Activity	5 min	C3-116 (pp. 11–16)

TP	Description	Method	Time	Refs
TP6	Identify the wing control surfaces, to include: a. ailerons; and b. flaps.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP7	Explain that the ailerons lift one wing and lower the opposite wing simultaneously as the one cockpit control is operated to control roll.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP8	Explain that flaps are used to generate lift at the expense of airspeed and that both left and right flaps operate simultaneously.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP9	Explain that trim tabs were developed to hold control surfaces in position without constant control pressure from the pilot. Identify common locations of trim tabs.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP10	Explain that dynamically balanced control surfaces use air pressure to assist the pilot moving the controls by having a portion of the control surface in front of its hinge to catch the passing air.	Interactive Lecture	5 min	C3-116 (pp. 11–16)
TP11	Colour and label the control surfaces in a drawing of an aircraft.	In-Class Activity	5 min	C3-116 (pp. 11–16)

5. **Time:**

a. Introduction / Conclusion:	5 min
b. Interactive Lecture:	45 min
c. In-Class Activity:	10 min
d. Total:	60 min

6. **Substantiation:**

- An interactive lecture was chosen for TP1 to TP4 and TP6 to TP10 to introduce aircraft control surfaces and give an overview of them.
- An in-class activity was chosen for TP5 and TP11 as it is an interactive way to provoke thought and stimulate an interest among the cadets.

7. **References:** C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Pepler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.8. **Training Aids:**

- Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and
- Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail.

9. **Learning Aids:** Coloured pencils.
10. **Test Details:** N/A.
11. **Remarks:** It is recommended that the two periods required for this EO be scheduled consecutively.

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EO C231.01 – OPERATE AN EXPERIMENTAL WING

1. **Performance:** Operate an Experimental Wing
2. **Conditions:**
 - a. Given:
 - (1) Materials to create airfoils for testing;
 - (2) Material and plans for constructing a wind tunnel;
 - (3) Two multi-speed fans;
 - (4) Supervision; and
 - (5) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references the cadet shall:
 - a. build an experimental wing; and
 - b. operate the experimental wing.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Identify the five parts of a wind tunnel, to include: <ol style="list-style-type: none"> a. settling chamber; b. contraction cone; c. test section; d. diffuser; and e. drive section. 	Interactive Lecture	5 min	C-093
TP2	Have the cadets, working as a team, assemble a wind tunnel.	In-Class Activity	15 min	C-093
TP3	Have the cadets, as a member of a group of no more than four, form airfoil shapes for testing in the wind tunnel.	In-Class Activity	10 min	C3-091 (p. 31) C3-116 (p. 21)
TP4	Have the cadets place airfoils in the wind tunnel and compare lift and drag.	In-Class Activity	25 min	C3-093

5. **Time:**

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|-------------------------------|--------|
| a. Introduction / Conclusion: | 5 min |
| b. Interactive Lecture: | 5 min |
| c. In-Class Activity: | 50 min |
| d. Total: | 60 min |

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 to introduce wind tunnels and give an overview of them.
- b. An in-class activity was chosen for TP2 to TP4 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References:**

- a. C3-091 (ISBN 1-55652-477-3) Carson, M.K. (2003). *The Wright Brothers for Kids: How They Invented the Airplane*. Chicago, IL: Chicago Review Press.
- b. C3-093 NASA. (1996). *NASA's Observatorium Teacher's Guide*. Retrieved 12 February 2007, from http://observe.arc.nasa.gov/nasa/aero/tunnel/tunnel_parts.html.
- c. C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Pepler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area;
- b. Cardboard boxes;
- c. Blank OHP slides;
- d. Duct tape;
- e. Two multi-speed fans; and
- f. Box cutter.

9. **Learning Aids:**

- a. File folders (letter-size);
- b. Tape;
- c. Stapler; and
- d. Locally available materials for constructing experimental wings.

10. **Test Details:** N/A.

11. **Remarks:** It is recommended that the two periods required for this EO be scheduled consecutively.

EO C231.02 – FLY A PAPER COLDITZ GLIDER

1. **Performance:** Fly a Paper Colditz Glider
2. **Conditions:**
 - a. Given:
 - (1) Directions and materials required to construct a paper Colditz glider;
 - (2) Supervision; and
 - (3) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental:
 - (1) Suitable classroom facilities or training area large enough to accommodate the entire group; and
 - (2) Suitable area for flying paper gliders.
3. **Standard:** In accordance with specified references, the cadet shall:
 - a. construct a paper Colditz glider; and
 - b. fly the paper Colditz glider.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain the history and design of a paper Colditz glider, to include: <ol style="list-style-type: none"> a. history; b. construction; c. trimming for flight; and d. flying tips. 	Interactive Lecture	15 min	C3-094 C3-058 (pp. 5–9)
TP2	Supervise the cadets' construction of a paper model of the Colditz glider.	In-Class Activity	20 min	C3-017 (pp. 52–56) C3-058 (pp. 52–55)
TP3	Supervise the cadets flying their paper Colditz gliders.	In-Class Activity	15 min	C3-058 (pp. 9–11)
TP4	Discuss flying paper Colditz gliders.	Group Discussion	5 min	C3-058 (pp. 9–11)

5. **Time:**

a. Introduction / Conclusion:	5 min
b. Interactive Lecture:	15 min
c. In-Class Activity:	35 min
d. Group Discussion:	5 min
e. Total:	60 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 as it introduces paper gliders, orients the cadets to the topic and generates interest.
- b. An in-class activity was chosen for TP2 and TP3 as it is an interactive way to provoke thought and stimulate interest among cadets and confirm the cadets' comprehension of the material.
- c. A group discussion was chosen for TP4 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions and feelings about paper gliders.

7. **References:**

- a. C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders*. New York, NY: Sterling Publishing.
- b. C3-058 (ISBN 1-4027-3034-9) Schmidt, N. (2005). *Paper Creations Paper Airplanes*. New York, NY: Sterling Publishing.
- c. C3-094 Colditz Museum. (2005). *Colditz Glider*. Retrieved 23 February 2007, from <http://www.colditz-4c.com/glider.htm>.

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area;
- b. Completed paper Colditz glider for demonstration purposes;
- c. Directions to construct a paper glider located at A-CR-CCP-802/PF-001, Annexes A, B and C; and
- d. Materials required to construct a paper glider.

9. **Learning Aids:**

- a. Directions to construct a paper Colditz glider located at A-CR-CCP-802/PF-001, Annexes A, B and C;
- b. Card stock (4 x 5 inch);
- c. Glue stick;
- d. Scissors;
- e. Ruler;
- f. Pencil; and
- g. Coloured markers.

10. **Test Details:** N/A.

11. **Remarks:**

- a. It is recommended that the two periods required for this EO be scheduled consecutively.
- b. If the weather is not suitable to fly the paper gliders outdoors, flights may take place indoors.

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EO C231.03 – TOUR A FLIGHT SCHOOL

1. **Performance:** Tour a Flight School
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: The squadron Commanding Officer will determine the conditions suitable for this training.
3. **Standard:** The cadet shall tour a flight school to identify aspects of flight training.
4. **Teaching Points:** The tour guide is asked to explain the:
 - a. length of time for the Ministry of Transport ground school requirement;
 - b. training schedule at the flight school;
 - c. topics to be covered during training;
 - d. availability of training aircraft and instructors;
 - e. certifications that are offered;
 - f. costs associated with training; and
 - g. control surfaces and parts of an airplane using a static example.
5. **Time:**

a. Introduction / Conclusion:	10 min
b. Field Trip :	80 min
c. Total:	90 min
6. **Substantiation:** A field trip approach was chosen for this lesson to reinforce cadets' knowledge of material previously taught in EO M231.01 (Identify the Four Forces That Act Upon an Aircraft), EO M231.02 (Describe the Production of Lift by an Aircraft Wing), EO M231.03 (Describe the Types of Drag That Act Upon an Aircraft), EO M231.04 (Describe the Axial Movements of an Aircraft) and EO M231.05 (Describe Aircraft Control Surfaces) through participation in a tour.
7. **References:** N/A.
8. **Training Aids:** N/A.
9. **Learning Aids:** N/A.
10. **Test Details:** N/A.
11. **Remarks:**
 - a. Cadet squadron personnel are to determine whether a guide will escort the group or if an instructor from the squadron will be responsible for conducting the tour. If an instructor from the squadron will conduct the tour, all teaching points are to be researched in advance.

- b. This field trip can be completed on a supported day or during a complementary session.
- c. There is no instructional guide for this lesson.

EO C231.04 – PARTICIPATE IN A PRESENTATION GIVEN BY A GUEST SPEAKER FROM THE LOCAL AVIATION COMMUNITY

1. **Performance:** Participate in a Presentation Given by a Guest Speaker From the Local Aviation Community
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Suitable classroom facilities or training area large enough for the entire group.
3. **Standard:** The cadet will participate in a presentation, given by a guest speaker from the local aviation community, to gain exposure to an aspect of aviation.
4. **Teaching Points:** The guest speaker is asked to:
 - a. describe the service or facility of which they are a member;
 - b. describe their duties;
 - c. explain the role of their service or facility in the community; and
 - d. facilitate a question and answer period.
5. **Time:**

a. Introduction / Conclusion:	10 min
b. Interactive Lecture:	50 min
c. Total:	60 min
6. **Substantiation:** An interactive lecture method was chosen for this lesson to review, clarify, emphasize and summarize the teaching points.
7. **References:** N/A.
8. **Training Aids:** Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area.
9. **Learning Aids:** N/A.
10. **Test Details:** N/A.
11. **Remarks:**
 - a. Required training aids should be determined by contacting the speaker prior to the presentation.
 - b. There is no instructional guide for this EO.

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EO C231.05 – TOUR A FLIGHT SIMULATOR

1. **Performance:** Tour a Flight Simulator
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: The squadron Commanding Officer will determine the conditions suitable for this training.
3. **Standard:** The cadet shall tour a flight simulator to identify aspects of flight training.
4. **Teaching Points:** The tour guide is asked to explain the:
 - a. procedure for booking the flight simulator;
 - b. procedure for operating the flight simulator;
 - c. availability of the flight simulator;
 - d. conditions which can be simulated;
 - e. availability of instructors; and
 - f. costs associated with using the flight simulator.
5. **Time:**

a. Introduction / Conclusion:	10 min
b. Field Trip :	80 min
c. Total:	90 min
6. **Substantiation:** A field trip approach was chosen for this lesson to reinforce cadets' knowledge of material previously taught in EO M231.01 (Identify the Four Forces That Act Upon an Aircraft), EO M231.02 (Describe the Production of Lift by an Aircraft Wing), EO M231.03 (Describe the Types of Drag That Act Upon an Aircraft), EO M231.04 (Describe the Axial Movements of an Aircraft) and EO M231.05 (Describe Aircraft Control Surfaces) through participation in a tour.
7. **References:** N/A.
8. **Training Aids:** N/A.
9. **Learning Aids:** N/A.
10. **Test Details:** N/A.
11. **Remarks:**
 - a. Cadet squadron personnel are to determine whether a guide will escort the group or if an instructor from the squadron will be responsible for conducting the tour. If an instructor from the squadron will conduct the tour, all teaching points are to be researched in advance.

- b. This field trip can be completed on a supported day or during a complementary session.
- c. There is no instructional guide for this lesson.

EO C231.06 – TOUR A LOCAL AIR SHOW

1. **Performance:** Tour a Local Air Show
2. **Conditions:**
 - a. Given:
 - (1) Supervision; and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: The squadron Commanding Officer will determine the conditions suitable for this training.
3. **Standard:** The cadet shall tour a local air show to identify aspects of aircraft and aircraft components that have been described in the classroom.
4. **Teaching Points:** The tour guide is asked to identify and explain:
 - a. types of aircraft on display at the show;
 - b. general aircraft components;
 - c. aircraft parts that contribute to the development of lift;
 - d. aircraft parts that contribute to drag;
 - e. aircraft control surfaces; and
 - f. types of engines used in aircraft on display at the show.
5. **Time:**

a. Introduction / Conclusion:	10 min
b. Field Trip :	170 min
c. Total:	180 min
6. **Substantiation:** A field trip approach was chosen for this lesson to reinforce cadets' knowledge of material previously taught in EO M231.01 (Identify the Four Forces That Act Upon an Aircraft), EO M231.02 (Describe the Production of Lift by an Aircraft Wing), EO M231.03 (Describe the Types of Drag That Act Upon an Aircraft), EO M231.04 (Describe the Axial Movements of an Aircraft) and EO M231.05 (Describe Aircraft Control Surfaces) through participation in a tour.
7. **References:** N/A.
8. **Training Aids:** N/A.
9. **Learning Aids:** N/A.
10. **Test Details:** N/A.
11. **Remarks:**
 - a. Cadet squadron personnel are to determine whether a guide will escort the group or if an instructor from the squadron will be responsible for conducting the tour. If an instructor from the squadron will conduct the tour, all teaching points are to be researched in advance.

- b. This field trip can be completed on a supported day or during a complementary session.
- c. There is no instructional guide for this lesson.