CHAPTER 14

PO 260 – PARTICIPATE IN AERODROME OPERATIONS ACTIVITIES

ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 1

EO M260.01 – EXPLAIN ASPECTS OF AIR TRAFFIC CONTROL (ATC)

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/PG-001, Chapter 4. Specific uses for said resources are identified throughout the Instructional Guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy flash cards located at Annex A. Paste flash cards with light signals on one side of the card and light signal commands on the reverse (e.g. 1-2, 3-4, 5-6, etc.).

Photocopy NORDO light signals matching activity located at Annex B for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for this lesson to orient the cadets to ATC, to give an overview of it, and to generate an interest.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to have participated in a discussion on ATC.

IMPORTANCE

It is important for cadets to understand the role of ATC at an aerodrome. This lesson will assist in stimulating the cadets' interest in aerospace activities which may lead to future summer training opportunities in the Air Cadet Program.

Teaching Point 1   **Explain the Role of an Air Traffic Controller at an Aerodrome**

Time: 10 min   Method: Interactive Lecture

> **Aerodrome.** Any area of land or water designed for the arrival, departure, movement and servicing of aircraft. It includes buildings, installations, and equipment situated therein.
>
> **Airport.** Any aerodrome with an airport certificate. Some airports are designated "international airports" to support international commercial air transport. An airport certificate testifies that the aerodrome meets airport certification safety standards.

The Role of the Air Traffic Controller

The ATC system is a vast network of people and equipment that ensures the safe operation of commercial and private aircraft.

The air traffic controller's' immediate concern is safety, but controllers must also direct planes efficiently to minimize delays. Their main responsibility is to organize the flow of aircraft into and out of the aerodrome.

Air traffic controllers coordinate the movement of air traffic to make certain that planes stay a safe distance apart. They prevent collisions between:

- aircraft,

- aircraft and obstructions, and

- aircraft and vehicles on the manoeuvring area.

In addition, air traffic controllers keep pilots informed about changes in weather conditions such as wind shear, a sudden change in the velocity or direction of the wind that can cause the pilot to lose control of the aircraft.

ATC Authorization

An ATC clearance is an authorization from an ATC unit for an aircraft to proceed within controlled airspace under specific conditions. Some air traffic controllers regulate traffic through designated airspaces; others regulate airport arrivals and departures.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1.   What is the air traffic controller's immediate concern?

Q2.   What are the three main things that air traffic controllers prevent collisions between?

Q3.   What is an ATC clearance?

ANTICIPATED ANSWERS

A1.   The air traffic controller's' immediate concern is safety.

A2.   Air traffic controllers prevent collisions between:

- aircraft,

- aircraft and obstructions, and

- aircraft and vehicles on the manoeuvring area.

A3.   An ATC clearance is an authorization from an ATC unit for an aircraft to proceed within controlled airspace under specific conditions.

Teaching Point 2   **Provide a Basic Overview of Radar Technology Used in ATC**

Time: 5 min   Method: Interactive Lecture

RADAR

The name "RADAR" is an abbreviation for "radio detection and ranging". To operate, radar requires a highly directional radio transmitter/antenna and a scope, or screen, to display the information received by the antenna.

The principle uses of radar in aviation are:

- ATC;

- fixing positions of airplanes in flight;

- detecting thunderstorm activity; and

- approaching and landing guidance to airplanes.

The use of radar in ATC greatly increases the utilization of the airspace and permits expansion of flight information services such as traffic and weather information and navigational assistance.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1.   What does the abbreviation "RADAR" mean?

Q2.   What are the principle uses of radar in aviation?

Q3.   What does the use of radar in ATC increase?

ANTICIPATED ANSWERS

A1.   "RADAR" is an abbreviation for "radio detection and ranging."

A2.   The principle uses of radar in aviation are:

- ATC;

- fixing positions of airplanes in flight;

- detecting thunderstorm activity; and

- approaching and landing guidance to airplanes.

A3.   The use of radar in ATC increases the utilization of the airspace.

Teaching Point 3   **Explain NORDO (Without Radio) Procedures at a Controlled Airport**

Time: 10 min   Method: In-class Activity

NORDO

Aircraft without radio (NORDO) are not permitted to operate at most large controlled airports served by the scheduled air carriers. Where they are permitted to operate (less busy controlled airports), they are directed by visual signals. A pilot must be alert to the light signals from the tower letting you know what to do.

Prior to initiating a NORDO flight, the pilot should contact the control tower to inform the controllers of their intentions and to secure a clearance for operation within the airspace. The tower will then be expecting the pilot and will be prepared to give the pilot light signals.

AUTHORIZED LIGHT SIGNALS (DEPARTING AIRCRAFT)

Flashing Green. Cleared to taxi.

Steady Green. Cleared for take-off.

Flashing Red. Taxi clear of runway in use.

Steady Red Light. Stop.

Flashing White. Return to starting point on airport.

Blinking Runway Lights. Vehicle and pedestrians are to vacate the runway immediately.

AUTHORIZED LIGHT SIGNALS (ARRIVING AIRCRAFT)

Steady Green Light. Clear to land.

Steady Red Light or Red Flare. Do not land. Continue in circuit. Avoid making sharp turns, climbing or diving after you receive the signal.

Flashing Green Light. Recall signal. Return for landing (usually to recall an airplane which has taken off or has been previously waved off with a red light). This will be followed by a steady green light when the approach path and landing area is clear.

Alternating Red and Green Light (U.S.). Danger. Be on alert. This signal may be used to warn you of such hazards as danger of collision, obstruction, soft field, ice on runways, mechanical failure of your undercarriage, etc. The danger signal is not a prohibitive signal and will be followed by a red or green light as circumstances warrant.

Flashing Red Light. Airport unsafe. Do not land.

Red Pyrotechnical Light. The firing of a red pyrotechnical light, whether by day or night and notwithstanding any previous instruction means "Do not land for the time being".

ACTIVITY

Time: 5 min

> Choose one activity from the following.
>
> Cadets will use flash cards and state the correct command for the appropriate light signal on the flash card, or they will complete the NORDO signal handout by matching the light signal to the appropriate command.

OBJECTIVE

The objective of this activity is to familiarize the cadets with light signals used in NORDO communication.

RESOURCES

Flash cards located at Annex A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Request a volunteer to stand in front of the class and select a flash card.

2. Once the cadet has selected the flash card ask them to confirm the answer on the back and hold up the flash card to the front of the class.

3. The class must determine the correct command of the light signal.

4. Once the class determines the command of the light signal. Have another volunteer come to the front of the class and select a flash card and repeat the activity.

SAFETY

N/A.

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to familiarize the cadets with light signals used in NORDO communication.

RESOURCES

Handout located at Annex B.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Distribute the NORDO Signals located at Annex B to each cadet.

2. Allow the cadets 4 min to match the light signals to the correct command.

3. Verify the correct answers with the cadets.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the NORDO communication activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Participating in a discussion on ATC will help the cadet learn about ATC and gain an appreciation of the role ATC plays in an aerodrome. Stimulating the cadets' interest in aerospace activities may lead to future summer training opportunities in the Air Cadet Program.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-096   (ISBN 1715-7382) Transport Canada. (2006). *Aeronautical Information Manual.* Ottawa, ON: Her Majesty the Queen in Right of Canada.

C3-097   U.S. Department of Labour. (2007). *Air Traffic Controllers.* Retrieved 9 February 2007, from http://www.bls.gov/oco/ocos108.htm.

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. Ltd.

ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 2

EO M260.02 – IDENTIFY ASPECTS OF BASIC AERODROME OPERATIONS

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/PG-001, Chapter 4. Specific uses for said resources are identified throughout the Instructional Guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Visit the CATSA Website for an up-to-date list of packing restrictions for air travellers.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for this lesson to orient the cadets to basic aerodrome operations, to generate interest and to give an overview of it.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to discuss basic aerodrome operations of a civilian aerodrome.

IMPORTANCE

It is important for cadets to discuss basic aerodrome operations at a civilian airport to gain an awareness of the services and facilities present at an aerodrome. This may generate an interest in aerodrome operations and may lead to future opportunities in the Air Cadet Program.

Teaching Point 1   **Discuss Basic Aerodrome Operations**

Time: 5 min   Method: Interactive Lecture

Basic operations at a civilian aerodrome are generally divided into three categories. They are air traffic control, ground control and airport maintenance.

AIR TRAFFIC CONTROL

Most people do not give second thought to who is actually in control of the aircraft when it is flying. Most people would say that the pilot has control of the direction and course of the aircraft but they would be mistaken.

The task of ensuring safe operations of commercial and private aircraft falls on air traffic controllers. They must coordinate the movements of thousands of aircraft, keep them at safe distances from each other, direct them during takeoff and landing, direct them around bad weather and ensure that traffic flows smoothly with minimal delays.

GROUND CONTROL

Ground control, sometimes known as Ground Movement Control (GMC) or Surface Movement Control (SMC) is responsible for the airport "manoeuvering" areas, or areas not released to the airlines or other users. This generally includes all taxiways, holding areas, and some transitional aprons or intersections where aircraft have arrived and vacated the runways and departure gates.

AIRPORT MAINTENANCE

Airport maintenance is responsible for a variety of airport field maintenance work, including general maintenance and construction work. They operate equipment and service a variety of power and general maintenance equipment in the upkeep of runways, taxiways, and aprons as well as perform other related duties.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1.   What three categories are basic operations divided into at a civilian aerodrome?

Q2.   What does GMC stand for?

Q3.   What is airport maintenance responsible for?

ANTICIPATED ANSWERS

A1.   Basic operations at a civilian aerodrome are generally divided into three categories. They are air traffic control, ground control and airport maintenance.

A2.   GMC stands for ground movement control.

A3.   Airport maintenance is responsible for a variety of airport field maintenance work, including general maintenance and construction work.

Teaching Point 2   **Explain the Role of Ground Controllers**

Time: 5 min   Method: Interactive Lecture

THE ROLE OF GROUND CONTROLLERS

Once an aircraft has landed, ground controllers provide the pilot with precise taxi information to passenger gates and jetways.

From the cockpit, it is difficult to assure that there is sufficient clearance between the aircraft structure and any buildings or other aircraft. Marshalling personnel are provided to assist aircraft when arriving at and departing from passenger gates and jetways.

While the goal of ground controllers is to maintain aircraft in such a manner as to assure safe flight, they must provide clearance for aircraft-to-taxi on the ground at the aerodrome while creating a safe environment while an aircraft is on the ground.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1.   What do ground controllers provide once an aircraft has landed?

Q2.   Why and when are marshalling personnel provided?

Q3.   What is the goal of ground controllers?

ANTICIPATED ANSWERS

A1.   Once an aircraft has landed, ground controllers provide the pilot with precise taxi information to passenger gates and jetways.

A2.   Marshalling personnel are provided to assist aircraft when arriving at and departing from passenger gates and jetways.

A3.   The goal of ground controllers is to maintain aircraft in such a manner as to assure safe flight.

Teaching Point 3   **Explain that Ground Facilities and Services Assist With Aircraft Arrivals and Departures**

Time: 5 min   Method: Interactive Lecture

Ground facilities and services assist with aircraft arrivals and departures. The following are some of the ground services and facilities that can be found at a basic aerodrome.

RUNWAY MAINTENANCE

Runway maintenance is responsible for the runway upkeep within the airport grounds. Duties range from tarmac servicing to keeping the runways in good condition. During the winter, the main focus of the work is on runway and taxiing area maintenance.

RUNWAY LIGHTING

Runway lighting is used at airports which allow night landings. Seen from the air, runway lights form an outline of the runway. A particular runway may have some or all of the following:

- **Runway End Identification Lights (REIL).** Unidirectional (facing approach direction) or omni-directional are a pair of synchronized flashing lights installed at the runway threshold, one on each side.

- **Runway End Lights.** Rows of lights on each side of the runway on precision instrument runways, these lights extend along the full width of the runway. These lights show green when viewed by approaching aircraft and red when seen from the runway.

- **Runway Edge Lights.** These are white elevated lights that run the length of the runway on either side. Taxiways are differentiated by being bordered by blue lights. On precision instrument runways, the edge-lighting becomes yellow in the last 2000 feet of the runway.

- **Runway Centreline Lighting System (RCLS).** These are lights embedded into the surface of the runway at 50 foot intervals along the runway centreline on some precision instrument runways. The lights are white except for the last 3000 feet. For the last 3000 feet, the lights alternate white and red for 2000 feet and red for the last 1000 feet.

- **Touchdown Zone Lights (TDZL).** This consists of rows of white light bars (with three in each row) on either side of the centreline over the first 3000 feet (or to the midpoint, whichever is less) of the runway.

- **Taxiway Centreline Lead-off Lights.** These are installed along lead-off markings. They are alternating green and yellow lights that are embedded into the runway pavement. They start with green lights branching off the runway centreline to the position of the first centreline light beyond the holding position on the taxiway.

- **Taxiway Centreline Lead-on Lights.** These are installed the same way as the taxiway centreline lead-off lights.

- **Land and Hold Short Lights.** These are a row of white pulsating lights installed across the runway to indicate the hold short position on some runways.

- **Approach Lighting System (ALS).** A lighting system installed on the approach end of an airport runway, it consists of a series of light bars, strobe lights, or a combination of the two that extend outward from the end of the runway.

BAGGAGE HANDLING

Baggage handlers work both indoors and outdoors at an aerodrome. They are responsible for making sure that not only does the mail, freight and luggage get onto the right aircraft but also that it gets there on time.

FUEL STORAGE SYSTEMS

Most of the large airports that service transport category aircraft have underground storage tanks and buried fuel lines. This arrangement allows the aircraft to be fuelled without having to carry the fuel to the aircraft in fuel trucks. Most aircraft that are fuelled from this type of system use under wing fuelling.

DE-ICING/ANTI-ICING

The successful treatment of ice and snow deposits on airplanes on the ground is an absolute necessity for safe winter operations. A flight that is expected to operate in known ground icing conditions shall not takeoff unless the aircraft has been inspected for icing and, if necessary, has been given the appropriate de-icing/anti-icing treatment. Accumulation of ice or other contaminants shall be removed so that the aircraft is kept in an airworthy condition prior to takeoff.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1.   What are five ground services or facilities that assist aircraft during arrivals and departures?

Q2.   What lights may a particular runway have?

Q3.   What is an absolute necessity for airplanes on the ground in winter operations?

ANTICIPATED ANSWERS

A1.   Ground services or facilities that assist aircraft during arrivals and departures are:

- runway maintenance,

- runway lighting,

- baggage handling,

- fuel storage systems, and

- de-icing/anti-icing.

A2.   A particular runway may have some or all of the following lights :

- REIL,

- runway end lights,

- runway edge lights,

- RCLS,

- TDZL,

- taxiway centreline lead-off lights,

- taxiway centreline lead-on-lights,

- land and hold short lights, and

- ALS.

A3.   The successful treatment of ice and snow deposits on aircraft on the ground is an absolute necessity for safe winter operations.

Teaching Point 4	Explain What the Canadian Air Transport Security Authority (CATSA) Is and Outline its Duties

Time: 10 min   Method: Interactive Lecture

CANADIAN AIR TRANSPORT SECURITY AUTHORITY (CATSA)

CATSA is a crown corporation based in the national capital region and it reports to Parliament through the Minister of Transport. It works with ground control to protect the public by securing critical elements of the air transportation system as assigned by the government. CATSA ensures passengers are aware of packing restrictions.

CATSA DUTIES AND RESPONSIBILITIES

CATSA is responsible for the following:

- Pre-Board Screening (PBS) of passengers and their belongings at Canada's major airports must be conducted before every flight.

- Acquiring, deploying, operating, and maintaining Explosive Detection Systems (EDS) equipment at designated airports which covers 99 percent of air travellers in Canada.

- Contracting for RCMP policing services and implementation of the Canadian Air Carrier Protective Program. Working with the RCMP for the provision of on-board security services under the Canadian Air Carrier Protective Program. This program covers selected domestic, trans-border and international flights, and all flights to Reagan National Airport in Washington, DC.

- The implementation of a restricted area identification card. CATSA has implemented an enhanced restricted area identification card for non-passengers which includes the use of biometric identifiers. This card is issued by the airport authority and enhances the security of restricted areas at major Canadian airports. The program includes a national database authenticating the validity of the identification card.

- Non-Passenger Screening (NPS) entering airport restricted areas. NPS has been regulated by Transport Canada since February 2004 in order to add another layer of security to Canada's air transport security system. The purpose of NPS is to enhance both airport and civil aviation security by operating random and unpredictable security screening checkpoints at entry points to or within airport restricted areas.

- Supplemental airport policing service contributions. Contributions toward airport policing costs: in the aftermath of September 11, 2001, new measures were implemented at airports to increase police presence. The Government of Canada, through CATSA, has committed to assisting selected airports with these additional costs.

Note: Refer to the CATSA Website at www.catsa-acsta.gc.ca for an up-to-date list of baggage packing restrictions for air travellers.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. What does CATSA stand for?

Q2. What are three duties and responsibilities of CATSA?

Q3. What item has CATSA implemented that includes the use of biometric identifiers?

ANTICIPATED ANSWERS

A1. CATSA stands for Canadian Air Transport Security Authority.

A2. Three duties and responsibilities of CATSA are (any three of the following):

- pre-board screening of passengers and their belongings;

- acquisition, deployment, operation and maintenance of explosive detection systems (eds);

- contracting for RCMP policing services on selected flights and all flights to Reagan National Airport, Washington, DC;

- the implementation of a restricted area identification card;

- the screening of non-passengers (nps) entering airport restricted areas; and

- making contributions for supplemental airport policing services.

A3.   CATSA has implemented an enhanced restricted area identification card for non-passengers which includes the use of biometric identifiers.

END OF LESSON CONFIRMATION

QUESTIONS

Q1.   What does SMC stand for?

Q2.   What is runway maintenance responsible for?

Q3.   What does NPS stand for?

ANTICIPATED ANSWERS

A1.   SMC stands for surface movement control.

A2.   Runway maintenance is responsible for the runway upkeep within the airport grounds.

A3.   NPS stands for non-passenger screening.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Discussing basic aerodrome operations at a civilian airport helps the cadet gain an awareness of the services and facilities present at an aerodrome. This may generate an interest in aerodrome operations and may lead to future opportunities in the Air Cadet Program.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-098   Canadian Air Transport Security Authority (CATSA). (2007). *Canadian Air Transport Security Authority: Mandate.* Retrieved 19 February 2007, from http://www.catsa-acsta.gc.ca/english/about_propos/.

C3-099   Airport Innovation. (2007). *Airport Ground Control Equipment.* Retrieved 21 February 2007, from http://www.airportinnovation.com/airport_ground.php.

THIS PAGE INTENTIONALLY LEFT BLANK

ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 3

EO C260.04 – PERFORM MARSHALLING

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/PG-001, Chapter 4. Specific uses for said resources are identified throughout the Instructional Guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Paste flash cards located at Annex C with marshalling signals on one side of the card and marshalling commands on the reverse (e.g. 1-2, 3-4, 5-6, etc.).

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 to present basic material on marshalling duties, orient the cadets to the topic and to generate interest.

Demonstration and performance was chosen for TP2 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire while providing an opportunity for the cadets to practice the skill under supervision.

A game was chosen for TP3 as it is a fun and challenging way to practice the skills taught during the lesson and to confirm the cadets' knowledge of the material.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of the lesson the cadet will have performed aircraft marshalling movements.

IMPORTANCE

It is important for the cadet to be familiar with marshalling signals as an orientation to aerodrome activities. Marshalling aircraft is one of the many duties performed by ground crew/maintenance staff at an aerodrome. Familiarizing the cadets with these tasks will expand their awareness of different roles in aerodrome operations.

Teaching Point 1	**Discuss the Importance of Marshalling at an Aerodrome**

Time: 5 min   Method: Interactive Lecture

WHY IS AIRCRAFT MARSHALLING USED?

- Aircraft marshalling ensures the safety of all aircraft and personnel on the ground. Marshalling is used to direct aircraft. The marshaller uses hand-held lighted wands to give signals to a pilot; the pilot then manoeuvres the aircraft into the correct position.

WHEN IS AIRCRAFT MARSHALLING USED?

- Aircraft marshalling is used when there are multiple aircraft moving on the ground, or a large aircraft is moving under its own power.

WHERE IS AIRCRAFT MARSHALLING USED?

- Aircraft marshalling is used when aircraft enter, depart or manoeuvre on the apron of an aerodrome.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1.   Why is marshalling used?

Q2.   When is marshalling used?

Q3.   Where is marshalling used?

ANTICIPATED ANSWERS

A1.   Where is marshalling used?

A2.   While aircraft are moving under their own power on the ground.

A3.   On the apron of an aerodrome.

Teaching Point 2   **Demonstrate and Allow Cadets to Practice Marshalling Signals**

Time: 10 min   Method: Demonstration and Performance
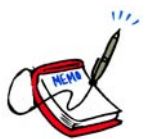
Using marshalling wands or lighted hand-held wands, demonstrate the following aircraft marshalling signals:

- stop,
- move ahead,
- move back,
- turn left,
- turn right,

- slow down,
- all clear,
- cut engines, and
- start engines.

In the real environment these signals are to be executed by the marshaller while positioned forward of the left wing tip of the aircraft, within view of the pilot.

Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-1 Marshalling Stop	Raise arms straight above the head. Move arms back and forth, crossing arms over the head.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-2 Marshalling Move Ahead	Arms are in the prove position, bent at the elbow, in front of the body with the upper arm parallel to the ground. Move the hands from in front of the body toward the head.

Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-3 Marshalling Move Back	Starting with the arms straight at the sides of the body, move arms from the waist toward the shoulders, out and away from the body.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-4 Marshalling Turn to Your Left	The right arm points to the right. The left arm is in the prove position, bent at the elbow, away from the body with the left hand above the head. Move the left arm back and forth from the shoulder to above the head.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-5 Marshalling Turn to Your Right	The right arm points to the right. The left arm is in the prove position, bent at the elbow, away from the body with the left hand above the head. Move the left arm back and forth from the shoulder to above the head.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-6 Marshalling Slow Down	With the arms out in front of the body, move the arms up and down from the waist to the shoulders.

Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-7 Marshalling All Clear	The left arm remains at the side of the body. The right arm is in the prove position, bent at the elbow, in front of the body with the upper arm parallel to the ground. Give the thumbs up signal with the right hand.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-8 Marshalling Cut Engines	The left arm remains at the side of the body. Position the right arm out from the shoulder, parallel to the tarmac. The right arm should be bent at the elbow. With the right hand, make a cutting motion in front of the throat.
Imperial Oil Limited. (2007). Aeronautical Information Manual. Retrieved 26 February 2007, from http://www.esso.ca/ Canada-English/Products/Aviation/PS_A_Marshalling.asp Figure 14-3-9 Marshalling Start Engine(s)	With the left arm straight above the head, form a "V" with the index and middle fingers. With the right arm bent and the upper arm parallel to the tarmac, point the index finger up and curl the fingers. Make a circular, counterclockwise motion with the right hand.

After each marshalling motion is demonstrated, the cadets will practice the motion. After demonstrating all signals, call out each signal and have the cadets execute them. Any combination of signals may be used. Flash cards can also be used for confirmation of this information.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1.   What is the marshalling signal for "start engine"?

Q2.   What is the marshalling signal for "stop"?

Q3.   What is the marshalling signal for "slow down"?

ANTICIPATED ANSWERS

A1.

A2.

A3.

Teaching Point 3   **Allow Cadets to Practice Marshalling Signals**

Time: 10 min   Method: Game

Choose one game from the following.

Either of these two games will be considered confirmation of this lesson.

Cadets will play a game where they pretend to marshal aircraft, or play the game "Simon Says". Either the instructor or a cadet may play the role of Simon. This game may be repeated as many times as needed for confirmation of the material.

ACTIVITY

OBJECTIVE

The objective of this game is to have the cadets practice marshalling signals.

RESOURCES

Marshalling wands or hand-held lighted wands.

ACTIVITY LAYOUT

This activity is to be conducted in a darkened work area suitable for practicing marshalling motions.

ACTIVITY INSTRUCTIONS

Cadets will play a game where they simulate marshalling aircraft. This game is done in pairs. The first cadet will marshal using marshalling wands or lighted wands. The second cadet will act as the aircraft. The second cadet will take directions from the signals given. The objective of the game is to park the "aircraft" safely.

SAFETY

While cadets are holding the wands, ensure the cadets are at least an arm's length apart to prevent wands from colliding.

ACTIVITY

OBJECTIVE

The objective of this game is to have the cadets practice marshalling signals.

RESOURCES

Marshalling wands or hand-held lighted wands.

ACTIVITY LAYOUT

This activity is to be conducted in a darkened work area suitable for practicing marshalling motions.

ACTIVITY INSTRUCTIONS

"Simon Says" is a game for three or more players. One of the people plays the role of Simon. The other players must do what Simon tells them to do. The key phrase is "Simon Says". If Simon says, "Simon says marshal stop", the rest of the players must marshal the signal for stop. If players do not marshal the signal for stop, those players are eliminated.

If Simon simply says, "Marshal stop", without saying "Simon says" first, the rest of the players should not marshal the signal stop; however, if any players marshall any signal, they are eliminated.

The game continues until there is only one player left. The last player in the game is considered the winner.

SAFETY

While cadets are holding the wands, ensure the cadets are at least an arm's length apart to prevent wands from colliding.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the marshalling activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

This lesson was an introduction to aerodrome activities. Marshalling aircraft is one of the many duties performed by ground crew/maintenance staff at an aerodrome.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C0-057   Transport Canada. (2006). *Aeronautical Information Manual.* Retrieved 26 September 2006, from http://www.tc.gc.ca/CivilAviation/publications/tp14371/AIR/1-1.htm#1-8.

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. Ltd.

C3-133   Imperial Oil Limited. (2007). *Marshalling Signals.* Retrieved 26 February 2007, from http://www.esso.ca/Canada-English/Products/Aviation/PS_A_Marshalling.asp.

LIGHT SIGNALS/COMMANDS FLASH CARDS

FLASHING GREEN
(DEPARTING AIRCRAFT)

Cleared to taxi.

STEADY GREEN
(DEPARTING AIRCRAFT)

Cleared for take-off.

FLASHING RED
(DEPARTING AIRCRAFT)

Taxi clear of runway in use.

STEADY RED
(DEPARTING AIRCRAFT)

Stop.

FLASHING WHITE
(DEPARTING AIRCRAFT)

Return to starting point on airport.

BLINKING RUNWAY LIGHTS
(DEPARTING AIRCRAFT)

Vehicle and pedestrians are to vacate the runway immediately.

STEADY GREEN LIGHT
(ARRIVING AIRCRAFT)

Clear to land.

STEADY RED LIGHT OR RED FLARE
(ARRIVING AIRCRAFT)

Do not land. Continue in circuit. Avoid making sharp turns, climbing or diving after you receive the signal.

FLASHING GREEN LIGHT
(ARRIVING AIRCRAFT)

Recall signal. Return for landing.
(Usually to recall an airplane which has taken off or has been previously waved off with a red light).

ALTERNATING RED AND GREEN LIGHT (U.S.)
(ARRIVING AIRCRAFT)

Danger. Be on alert. This signal may be used to warn you of such hazards as danger of collision, obstruction, soft field, ice on runways, mechanical failure of your undercarriage, etc.

FLASHING
RED LIGHT
(ARRIVING AIRCRAFT)

Airport unsafe. Do not land.

RED PYROTECHNICAL LIGHT
(ARRIVING AIRCRAFT)

The firing of a red pyrotechnical light, whether by day or night and notwithstanding any previous instruction means "Do not land for the time being".

NORDO SIGNALS

Match the NORDO Signal to the correct command.

DEPARTING AIRCRAFT	a. _____	Danger. Be on alert. This signal may be used to warn you of such hazards as danger of collision, obstruction, soft field, ice on runways, mechanical failure of your undercarriage, etc. The danger signal is not a prohibitive signal and will be followed by a red or green light as circumstances warrant.
1. Flashing green.		
2. Steady green.		
3. Flashing red.		
4. Steady red light.		
5. Flashing white.		
6. Blinking runway lights.	b. _____	Cleared to taxi.
ARRIVING AIRCRAFT	c. _____	The firing of a red pyrotechnical light, whether by day or night and notwithstanding any previous instruction means, "Do not land for the time being".
7. Steady green light.		
8. Steady red light or red flare.		
9. Flashing green light.	d. _____	Taxi clear of runway in use.
10. Alternating red and green light (U.S.).	e. _____	Vehicle and pedestrians are to vacate the runway immediately.
11. Flashing red light.		
12. Red pyrotechnical light.	f. _____	Stop.
	g. _____	Return to starting point on airport.
	h. _____	Clear to land.
	i. _____	Do not land. Continue in circuit. Avoid making sharp turns, climbing or diving after you receive the signal.
	j. _____	Airport unsafe. Do not land.
	k. _____	Cleared for take-off.
	l. _____	Recall signal. Return for landing (usually to recall an airplane which has taken off or has been previously waved off with a red light). This will be followed by a steady green light when the approach path and landing area is clear.

THIS PAGE INTENTIONALLY LEFT BLANK

NORDO SIGNALS – INSTRUCTOR ANSWER KEY

1. b

2. k

3. d

4. f

5. g

6. e

7. h

8. i

9. l

10. a

11. j

12. c

THIS PAGE INTENTIONALLY LEFT BLANK

MARSHALLING COMMANDS FLASH CARDS

STOP

Raise arms straight above the head.

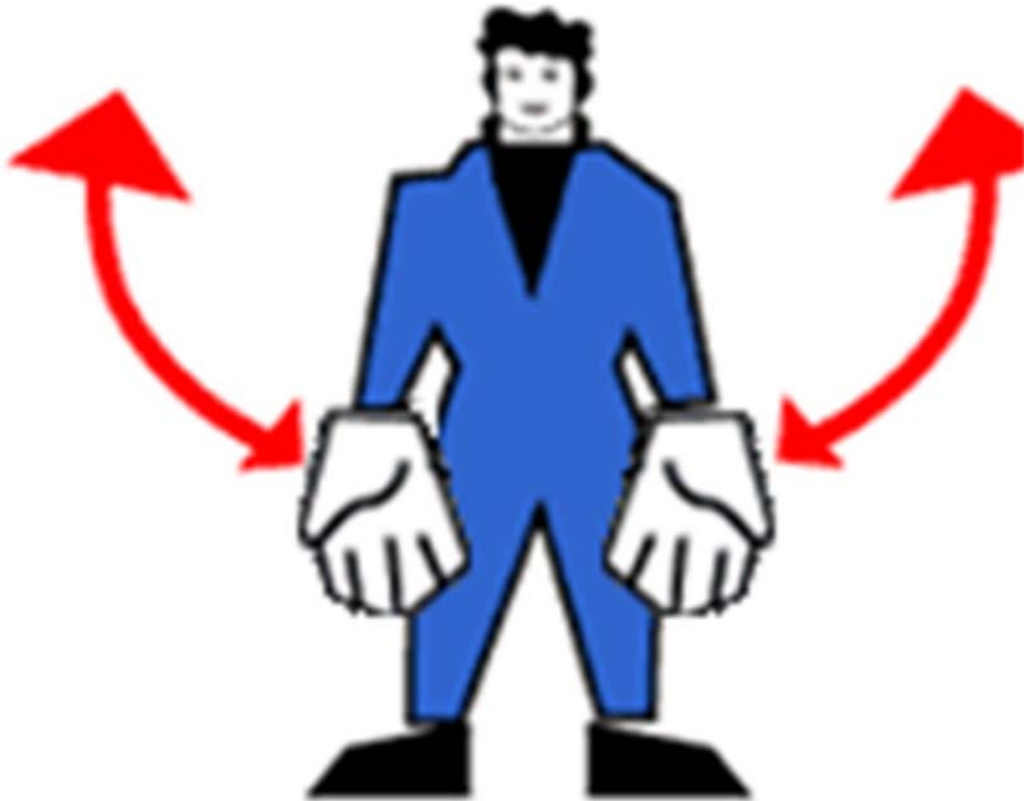Move arms back and forth, crossing arms over the head.

MOVE AHEAD

Arms are in the prove position, bent at the elbow, in front of the body with the upper arm parallel to the ground.

Move the hands from in front of the body toward the head.

MOVE BACK

Starting with the arms straight at the sides of the body, move arms from the waist toward the shoulders, out and away from the body.

TURN TO YOUR LEFT

The right arm points to the right.

The left arm is in the prove position, bent at the elbow, away from the body with the left hand above the head.

Move the left arm back and forth from the shoulder to above the head.

TURN TO YOUR RIGHT

The left arm points to the left.

The right arm is in the prove position, bent at the elbow, away from the body with the left hand above the head.

Move the right arm back and forth from the shoulder to above the head.

SLOW DOWN

With the arms out in front of the body, move the arms up and down from the waist to the shoulders.
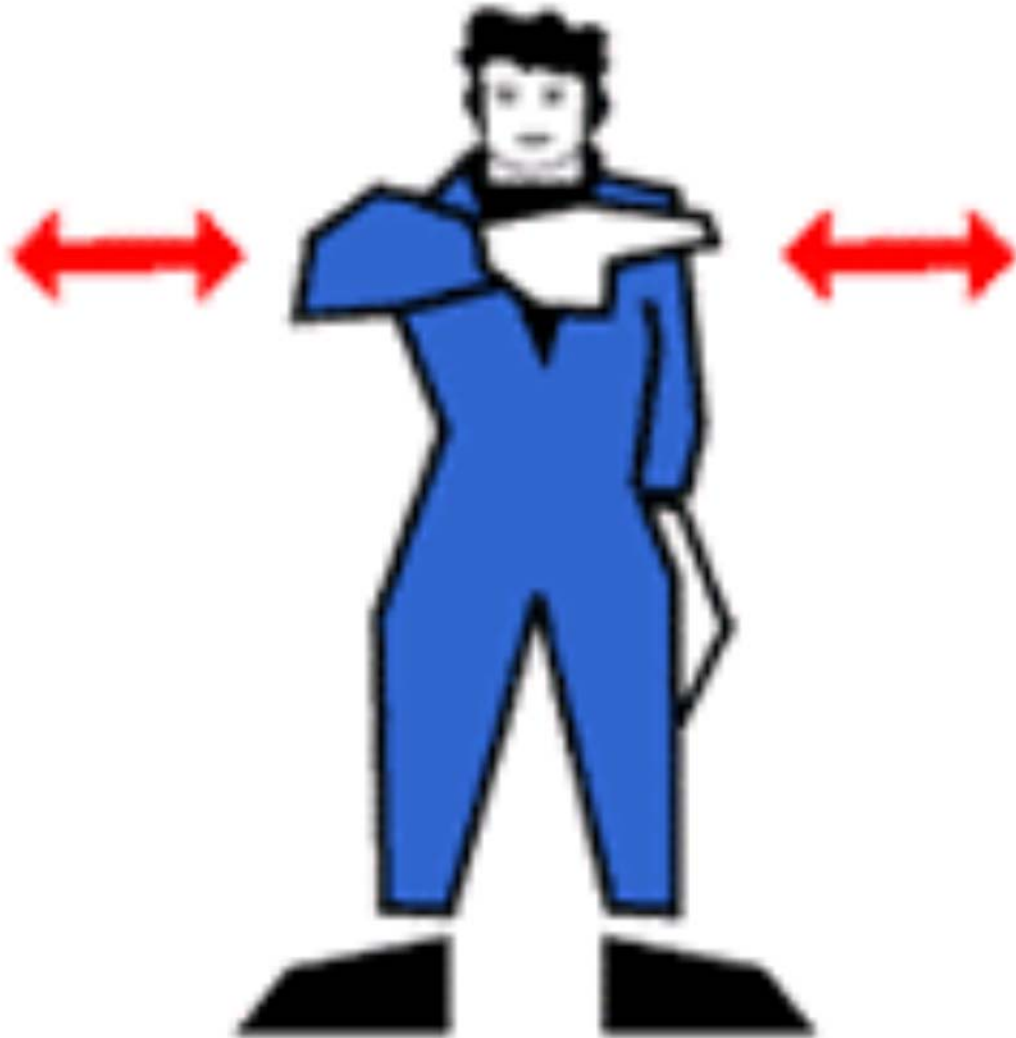
ALL CLEAR

The left arm remains at the side of the body.

The right arm is in the prove position, bent at the elbow, in front of the body with the upper arm parallel to the ground.

Give the thumbs up signal with the right hand.

CUT ENGINE(S)

The left arm remains at the side of the body.

Position the right arm out from the shoulder, parallel to the tarmac. The right arm should be bent at the elbow.

With the right hand, make a cutting motion in front of the throat.

START ENGINE(S)

With the left arm straight above the head, form a "V" with the index and middle fingers.

With the right arm bent and the upper arm parallel to the tarmac, point the index finger up and curl the fingers.

Make a circular, counter-clockwise motion with the right hand.