

**SECTION 14****PO 240 – PARTICIPATE IN AEROSPACE ACTIVITIES**

1. **Performance:** Participate in Aerospace Activities
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 participate in aerospace activities, to include:
  - a. exploring current advancements in aerospace technology;
  - b. inventing a space technology item; and
  - c. participating in a space survival scenario.
4. **Remarks:** N/A.
5. **Complementary Material:**
  - a. Complementary material associated with PO 240 is designed to enhance the cadet's knowledge of aerospace technology:
    - (1) EO C240.01 (Participate in a Non-Verbal Communication Activity);
    - (2) EO C240.02 (Invent a Communication System for Space);
    - (3) EO C240.03 (Identify Parts of a Rocket);
    - (4) EO C240.04 (Navigate With a Global Positioning System [GPS]);
    - (5) EO C240.05 (Simulate Survival in Space); and
    - (6) EO C240.06 (Determine Direction Using Constellations on a Field Exercise).
  - b. Complementary training associated with PO 240 is limited to a total of ten periods, which may be conducted during sessions or on a supported day. Squadrons are not required to use all ten periods.

THIS PAGE INTENTIONALLY LEFT BLANK

**EO M240.01 – EXPLORE CURRENT ADVANCEMENTS IN AEROSPACE TECHNOLOGY**

1. **Performance:** Explore Current Advancements in Aerospace Technology
2. **Conditions:**
  - a. Given:
    - (1) Supervision; and
    - (2) Assistance as required.
  - b. Denied: N/A.
  - c. Environmental: Suitable classroom facilities large enough to accommodate the entire group.
3. **Standard:** In accordance with *Space on Earth: How Technology Transfer Benefits Humanity*, and in groups of no more than four, the cadet shall explore current advancements in aerospace technology.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	<p>Conduct an activity to explore current advancements in aerospace technology. Cadets may come up with the following:</p> <ol style="list-style-type: none"> <li>a. satellite radio;</li> <li>b. video image stabilization and registration;</li> <li>c. satellite TV;</li> <li>d. DeBakey blood pump;</li> <li>e. global positioning system;</li> <li>f. temper foam;</li> <li>g. advanced communications technology;</li> <li>h. fire-resistant aircraft seats;</li> <li>i. excimer angioplasty system; and</li> <li>j. liquid-cooled garments, etc.</li> </ol> <p><b>Note:</b> Refer to <a href="http://www.space.com">http://www.space.com</a> for up-to-date advancements in space technology.</p>	In-Class Activity	25 min	C3-110

5. **Time:**
  - a. Introduction / Conclusion: 5 min
  - b. In-Class Activity: 25 min
  - c. Total: 30 min

6. **Substantiation:** An in-class activity was chosen for this lesson as it is an interactive way to present advancements in aerospace technology and stimulate interest among cadets.
7. **References:** C3-110 Space.com. (2006). *Space on Earth: How Technology Transfer Benefits Humanity*. Retrieved 27 February 2007, from [http://www.space.com/business/technology/tech\\_hallofame\\_030101-1.html](http://www.space.com/business/technology/tech_hallofame_030101-1.html).
8. **Training Aids:** Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area.
9. **Learning Aids:** Information cards.
10. **Test Details:** N/A.
11. **Remarks:** N/A.

**EO M240.02 – INVENT A SPACE TECHNOLOGY ITEM**

1. **Performance:** Invent a Space Technology Item
2. **Conditions:**
  - a. Given:
    - (1) Consumable items for construction;
    - (2) Supervision; and
    - (3) 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 Goodman, P., *Arty Facts: Space and Art Activities*, Crabtree Publishing, and in groups of no more than four, the cadet shall invent a space technology item, to include:
  - a. brainstorming ideas about the invention;
  - b. designing the idea on paper; and
  - c. constructing the item out of consumable items.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that there are many challenges astronauts encounter while in space, such as: <ol style="list-style-type: none"> <li>a. transportation to and from space; and</li> <li>b. the living environment.</li> </ol>	Interactive Lecture	5 min	C3-040 (p. 36)
TP2	Conduct an activity where cadets invent and construct a space technology item.	In-Class Activity	35 min	
TP3	Conduct a group discussion where cadets share their space technology item with the entire group.	Group Discussion	15 min	

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

6. **Substantiation:**
  - a. An interactive lecture was chosen for TP1 to orient the cadets to space technology and to give an overview of it.
  - b. An in-class activity was chosen for TP2 as it is an interactive way to provoke thought and stimulate interest among cadets.
  - c. A group discussion was chosen for TP3 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions and feelings about space technology.
7. **References:** C3-040 (ISBN 0-7787-1140-4) Goodman, P. (2002). *Arty Facts: Space and Art Activities*. St. Catharines, ON. Crabtree Publishing.
8. **Training Aids:** Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area.
9. **Learning Aids:** Consumable items for construction.
10. **Test Details:** N/A.
11. **Remarks:** N/A.

**EO M240.03 – PARTICIPATE IN A SPACE SURVIVAL SCENARIO**

1. **Performance:** Participate in a Space Survival Scenario
2. **Conditions:**
  - a. Given:
    - (1) Survival kit list;
    - (2) Survival scenario;
    - (3) Supervision; and
    - (4) 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 *Space Survival Challenge* and in groups of no more than four, the cadets shall participate in a space survival scenario, to include:
  - a. choosing a limited number of survival items from a given list; and
  - b. discussing chosen survival items.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	In groups of no more than four have cadets choose five items from the following survival list to survive in space: <ol style="list-style-type: none"> <li>a. a box of matches;</li> <li>b. 2 x 50 kg tanks of oxygen;</li> <li>c. 20 litre of water;</li> <li>d. 15 m of nylon rope;</li> <li>e. a magnetic compass;</li> <li>f. a stellar map of the Moon's constellations;</li> <li>g. a solar-powered receiver-transmitter; and</li> <li>h. a reconstituted food package.</li> </ol>	In-Class Activity	15 min	C3-111
TP2	Have the cadets explain why they chose their items for survival.	Group Discussion	10 min	

5. **Time:**
  - a. Introduction / Conclusion: 5 min
  - b. In-Class Activity: 15 min
  - c. Group Discussion: 10 min
  - d. Total: 30 min

6. **Substantiation:**

- a. An in-class activity was chosen for TP1 as it is an interactive way to provoke thought and stimulate an interest in space survival among cadets.
- b. A group discussion was chosen for TP2 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions, and feelings about the topic.

7. **References:** C3-111 Lakeland Central School District. (2007). *Space Survival Challenge*. Retrieved February 27, 2007, from <http://www.lakelandschools.org/EDTECH/leslie/space.htm>.

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area;
- b. Survival kit list; and
- c. Survival scenario.

9. **Learning Aids:**

- a. Survival kit list; and
- b. Survival scenario.

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

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



**EO C240.01 – PARTICIPATE IN A NON-VERBAL COMMUNICATION ACTIVITY**

1. **Performance:** Participate in a Non-verbal Communication Activity
2. **Conditions:**
  - a. Given:
    - (1) Cue cards;
    - (2) Supervision; and
    - (3) 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 *Communication in the Workplace: Non-verbal Communication (Body Language)*, the cadet shall participate in a non-verbal communication activity to gain a familiarization with an alternate method of communication.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain the use of body language as a form of non-verbal communication.	Interactive Lecture	5 min	C3-104
TP2	Explain the use of gestures as a form of non-verbal communication, to include: <ol style="list-style-type: none"> <li>a. waving;</li> <li>b. making a fist;</li> <li>c. thumbs up; and</li> <li>d. pointing.</li> </ol>	Interactive Lecture	5 min	C3-104
TP3	Conduct an activity where the cadets name an emotion that they have shown in the last week, such as: <ol style="list-style-type: none"> <li>a. sorrow;</li> <li>b. fear;</li> <li>c. satisfaction;</li> <li>d. surprise;</li> <li>e. happiness; and</li> <li>f. anger.</li> </ol> <p><b>Note:</b> Have the cadets take turns acting out an emotion without verbal communication. Have the group determine the emotion.</p>	In-Class Activity	15 min	C3-104

5. **Time:**

- |                               |        |
|-------------------------------|--------|
| a. Introduction / Conclusion: | 5 min  |
| b. Interactive Lecture:       | 10 min |
| c. In-Class Activity:         | 15 min |
| d. Total:                     | 30 min |

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 and TP2 to orient the cadets to the topic, generate interest and to give an overview of non-verbal communication.
- b. An in-class activity was chosen for TP3 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References:** C3-104 Australian Government, Department of Education, Science and Training. (2007). *Communication in the Workplace: Non-verbal Communication (Body Language)*. Retrieved 22 February 2007, from [http://www.dest.gov.au/nwt/hospitality/comm\\_non.htm](http://www.dest.gov.au/nwt/hospitality/comm_non.htm).

8. **Training Aids:**

- a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and
- b. Cue cards.

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

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

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

**EO C240.02 – INVENT A COMMUNICATION SYSTEM FOR SPACE**

1. **Performance:** Invent a Communication System for Space
2. **Conditions:**
  - a. Given:
    - (1) Message cue cards;
    - (2) Supervision; and
    - (3) 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 *Two-way Radio Communication Failure*, and in groups of no more than four, the cadets shall invent a communication system for space.

4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain that astronauts use radio communication while in space to communicate with other astronauts and ground control.	Interactive Lecture	5 min	C3-135
TP2	Conduct an activity where cadets invent a communication system for space, to include: <ol style="list-style-type: none"> <li>a. a system that does not require speech; and</li> <li>b. a system that does not allow for written words.</li> </ol>	In-Class Activity	40 min	
TP3	Conduct a group discussion where cadets share their communication system invention with the entire group.	Group Discussion	10 min	

5. **Time:**

- |                               |        |
|-------------------------------|--------|
| a. Introduction / Conclusion: | 5 min  |
| b. Interactive Lecture:       | 5 min  |
| c. In-Class Activity:         | 40 min |
| d. Group Discussion:          | 10 min |
| e. Total:                     | 60 min |

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 to orient the cadets to space communication, to give an overview of it and to generate interest in the subject.

- b. An in-class activity was chosen for TP2 as it is an interactive way to present the content and stimulate an interest among cadets.
  - c. A group discussion was chosen for TP3 as it allows the cadets to interact with their peers and share their knowledge, experience, opinions and feelings about space communication.
7. **References:** C3-135 Virtual Skies. (2007). *Two-way Radio Communication Failure (Aeronautical Information Manual Section 6.4.1)*. Retrieved March 18, 2007, from [http://virtualskies.arc.nasa.gov/communication/youDecide/AIM6\\_4\\_1.html](http://virtualskies.arc.nasa.gov/communication/youDecide/AIM6_4_1.html).
  8. **Training Aids:** Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area.
  9. **Learning Aids:** Message cue cards.
  10. **Test Details:** N/A.
  11. **Remarks:** N/A.

**EO C240.03 – IDENTIFY PARTS OF A ROCKET**

1. **Performance:** Identify Parts of a Rocket
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 *Rocket Parts*, the cadet shall identify parts of a rocket to become familiar with its components.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain the following parts of a rocket: <ol style="list-style-type: none"> <li>a. the structure system, to include:               <ol style="list-style-type: none"> <li>(1) the nose cone;</li> <li>(2) fuel;</li> <li>(3) the frame;</li> <li>(4) the oxidizer;</li> <li>(5) the pumps;</li> <li>(6) the nozzle; and</li> <li>(7) the fin;</li> </ol> </li> <li>b. the propulsion system;</li> <li>c. the payload system; and</li> <li>d. the guidance system.</li> </ol>	Interactive Lecture	15 min	C3-106
TP2	Conduct an activity naming the parts of a rocket.	In-Class Activity	10 min	C3-106

5. **Time:**
  - a. Introduction / Conclusion: 5 min
  - b. Interactive Lecture: 15 min
  - c. In-Class Activity: 10 min
  - d. Total: 30 min

6. **Substantiation:**

- a. An interactive lecture was chosen for TP1 to orient the cadets to the parts of a rocket, generate interest and present basic material.
- b. An in-class activity was chosen for TP2 as it is an interactive way to confirm the cadet's comprehension of the material.

7. **References:** C3-106 NASA. (2006). *Rocket Parts*. Retrieved 22 February 2007, from <http://exploration.grc.nasa.gov/education/rocket/rockpart.html#>.

8. **Training Aids:** Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area.

9. **Learning Aids:**

- a. Rocket parts puzzle; and
- b. Parts of a rocket handout.

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

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

**EO C240.04 – NAVIGATE WITH A GLOBAL POSITIONING SYSTEM (GPS)**

1. **Performance:** Navigate With a Global Positioning System (GPS)
2. **Conditions:**
  - a. Given:
    - (1) GPS (one per five cadets) (Type TBD);
    - (2) Supervision; and
    - (3) Assistance as required.
  - b. Denied: N/A.
  - c. Environmental: Field setting during the day, large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, and in a group of no more than five, the cadet shall navigate with a GPS on a field exercise.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Describe the GPS, to include: <ol style="list-style-type: none"> <li>a. what is a GPS;</li> <li>b. how accurate is a GPS;</li> <li>c. the GPS satellite system; and</li> <li>d. the source of GPS signal errors.</li> </ol>	Interactive Lecture	5 min	See Remarks para 11.b. C3-117
TP2	Explain what a GPS tells the user, to include: <ol style="list-style-type: none"> <li>a. standard features, to include:               <ol style="list-style-type: none"> <li>(1) your position – coordinates and elevation;</li> <li>(2) distance to a waypoint;</li> <li>(3) speed of travel;</li> <li>(4) direction of travel (may not work in low speeds);</li> <li>(5) estimated time of arrival; and</li> <li>(6) cross track error (lateral distance off a straight line course); and</li> </ol> </li> <li>b. extra features, to include:               <ol style="list-style-type: none"> <li>(1) built-in maps;</li> <li>(2) sunrise/sunset;</li> <li>(3) signal strength indicators;</li> <li>(4) battery strength indicators;</li> <li>(5) audible alarm; and</li> <li>(6) course deviation errors.</li> </ol> </li> </ol>	Demonstration and Performance	10 min	See Remarks para 11.b. C3-117

TP	Description	Method	Time	Refs
TP3	Operate the GPS, to include: <ol style="list-style-type: none"> <li>turn on and initialize the GPS;</li> <li>review the various screens;</li> <li>identify battery strength;</li> <li>locate your current grid reference;</li> <li>identify your direction of travel;</li> <li>set your current waypoint;</li> <li>set a waypoint (not your current position);</li> <li>set the go-to to a preset waypoint; and</li> <li>turn off the GPS.</li> </ol>	Practical Activity	20 min	See Remarks para 11.b. C3-117
TP4	Navigate a route.	Practical Activity	50 min	

5. **Time:**

a. Introduction / Conclusion:	5 min
b. Interactive Lecture:	5 min
c. Demonstration and Performance:	10 min
d. Practical Activity:	70 min
e. Total:	90 min

6. **Substantiation:**

- An interactive lecture was chosen for TP1 to introduce a new subject and give an overview of GPS navigation.
- Demonstration and performance was chosen for TP2 as it allows the instructor to explain and demonstrate navigating with a GPS while providing an opportunity for the cadet to practice the skill under supervision.
- A practical activity was chosen for TP3 and TP4 as it is an interactive way to introduce cadets to navigating with a GPS. This activity contributes to the development of these skills and knowledge in a fun and challenging setting.

7. **References:**

- See Remarks 11.b.
- C3-117 (ISBN 0-96-522025-7) Ferguson, M. H. (1996). *GPS Land Navigation: A Complete Guide Book for Backcountry Users of the NAVSTAR Satellite System*. Calgary, AB: Glassford Publishing.
- C3-132 (ISBN 1-894765-48-6) Letham, L. (2003). *GPS Made Easy*. Surrey, BC: Rocky Mountain Books.

8. **Training Aids:**

- GPS (Type TBD); and
- GPS User's Guide.



9. **Learning Aids:** GPS (one per five cadets) (Type TBD).
10. **Test Details:** N/A.
11. **Remarks:**
  - a. This lesson will be presented during the field exercise associated with PO 290 (Participate in a Field Exercise).
  - b. The reference information for this EO will be contained in the User's Guide for the GPS selected for training.

THIS PAGE INTENTIONALLY LEFT BLANK

**EO C240.05 – SIMULATE SURVIVAL IN SPACE**

1. **Performance:** Simulate Survival in Space
2. **Conditions:**
  - a. Given:
    - (1) a box of matches;
    - (2) a magnetic compass;
    - (3) a stellar map of the Moon;
    - (4) two military water cans (to simulate oxygen tanks);
    - (5) four two-litre bottles to simulate water;
    - (6) ten metres of nylon rope;
    - (7) simulated food boxes;
    - (8) a radio;
    - (9) a fire blanket;
    - (10) a map of the training area;
    - (11) supervision; and
    - (12) assistance as required.
  - b. Denied: N/A.
  - c. Environmental: Suitable indoor or outdoor training area large enough to accommodate the entire group.
3. **Standard:** In accordance with *Space Survival Challenge* and in groups of no more than four, the cadet shall simulate survival in space.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Conduct an in-class activity where cadets choose any five of the following items to survive in space: <ol style="list-style-type: none"> <li>a. a box of matches;</li> <li>b. a compass;</li> <li>c. 2 military water cans (to simulate oxygen tanks);</li> <li>d. 4 two-litre bottles to simulate water;</li> <li>e. 10 metres of nylon rope;</li> <li>f. simulated food boxes;</li> <li>g. a radio;</li> <li>h. a fire blanket; and</li> <li>i. a map of the training area.</li> </ol>	In-Class Activity	35 min	C3-111

TP	Description	Method	Time	Refs
TP2	Conduct a group discussion and have the groups explain why they chose their items for survival.	Group Discussion	20 min	

5. **Time:**

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

6. **Substantiation:**

- An in-class activity was chosen for TP1 as it is an interactive way to reinforce survival in space, provoke thought and stimulate an interest among cadets.
- A group discussion was chosen for TP2 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions, and feelings about survival in space.

7. **References:** C3-111 Lakeland Central School District. (2007). *Space Survival Challenge*. Retrieved 27 February 2007, from <http://www.lakelandschools.org/EDTECH/leslie/space.htm>.8. **Training Aids:** N/A.9. **Learning Aids:**

- a box of matches;
- a magnetic compass;
- a stellar map of the Moon;
- two military water cans (to simulate oxygen tanks);
- four two-litre bottles to simulate water;
- ten metres of nylon rope;
- simulated food boxes;
- a radio;
- a fire blanket; and
- a map of the training area.

10. **Test Details:** N/A.11. **Remarks:** N/A.

**EO C240.06 – DETERMINE DIRECTION USING CONSTELLATIONS ON A FIELD EXERCISE**

1. **Performance:** Determine Direction Using Constellations on a Field Exercise
2. **Conditions:**
  - a. Given:
    - (1) Supervision; and
    - (2) Assistance as required.
  - b. Denied: N/A.
  - c. Environmental: Field setting during night large enough to accommodate the entire group.
3. **Standard:** In accordance with specified references, the cadet shall determine direction using constellations on a field exercise.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Determine direction at night using Polaris, to include: <ol style="list-style-type: none"> <li>a. locating Polaris using Cassiopeia and the Big Dipper; and</li> <li>b. determining north using Polaris.</li> </ol>	Demonstration and Performance	25 min	C2-008 (pp. 356–353) C2-041 (pp. 133–134)

5. **Time:**
  - a. Introduction / Conclusion: 5 min
  - b. Demonstration and Performance: 25 min
  - c. Total: 30 min
6. **Substantiation:** Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate determining direction while providing an opportunity for the cadet to practice this skill under supervision.
7. **References:**
  - a. C2-008 (ISBN 0-00-265314-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.
  - b. C2-041 (ISBN 0-07-136110-3) Seidman, D. with Cleveland, P. (2001). *The Essential Wilderness Navigator*. Camden, ME: Ragged Mountain Press.
8. **Training Aids:** N/A.
9. **Learning Aids:** N/A.
10. **Test Details:** N/A.
11. **Remarks:** This lesson is to be conducted at night however the knowledge portion of this lesson can be conducted during daylight hours.