

SECTION 16**PO 340 – IDENTIFY ASPECTS OF SPACE EXPLORATION**

1. **Performance.** Identify Aspects of Space Exploration.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet will identify aspects of space exploration, to include:
 - a. identifying Canadian astronauts, and
 - b. discussing the history of manned space exploration.
4. **Remarks.** N/A.
5. **Complementary Material.** Complementary material associated with PO 340 is designed to enhance the cadet's knowledge of space exploration, to include :
 - a. EO C340.01 (Identify Canadian Astronauts),
 - b. EO C340.02 (Discuss the Canadian Space Program),
 - c. EO C340.03 (Discuss Unmanned Space Exploration),
 - d. EO C340.04 (Describe Elements of the Night Sky),
 - e. EO C340.05 (Simulate Life in Space),
 - f. EO C340.06 (Launch a Water Rocket),
 - g. EO C340.07 (Identify Global Position System [GPS] Components),
 - h. EO C340.08 (Describe Aspects of the International Space Station [ISS]),
 - i. EO C340.09 (Participate in a Presentation Given by a Guest Speaker From the Astronomy Community or Aerospace Industry), and
 - j. EO C340.10 (Identify Online Stargazing Programs).

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EO M340.01 – IDENTIFY CANADIAN ASTRONAUTS

1. **Performance.** Identify Canadian Astronauts.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify Canadian astronauts, to include:
 - a. Marc Garneau,
 - b. Roberta Bondar,
 - c. Steve MacLean,
 - d. Chris Hadfield,
 - e. Robert Thirsk,
 - f. Bjarni Trygvassen,
 - g. David Williams, and
 - h. Julie Payette.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Identify Canadian astronauts, to include: <ol style="list-style-type: none"> a. Marc Garneau, b. Roberta Bondar, c. Steve MacLean, d. Chris Hadfield, e. Robert Thirsk, f. Bjarni Trygvassen, g. David Williams, h. Julie Payette, and i. any additional Canadian astronauts. 	Interactive Lecture	10 min	C3-238

TP	Description	Method	Time	Ref
TP2	Discuss the professional and personal profiles of two Canadian astronauts, to include: <ol style="list-style-type: none"> a. missions, b. place and date of birth, c. education, d. professional experience, e. special honours, and f. affiliations. 	Interactive Lecture	15 min	C3-238

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to Canadian astronauts, to generate interest in Canada's space program, and to emphasize the teaching points.

7. **Reference.** C3-238 Canadian Space Agency. (2008). *Canadian Space Agency*. Retrieved February 9, 2008, from <http://www.space.gc.ca/asc/eng/default.asp>.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.

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

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

11. **Remarks**

- a. The instructor shall obtain the latest biographical information for this EO. This material must be updated each year to reflect the Canadian Space Agency's recent activities.
- b. A list shall be kept of astronauts that cadets have focused on to prevent repetition, since other lessons, such as EO C340.01 (Identify Canadian Astronauts), may introduce other astronauts in the future.

EO M340.02 – DISCUSS THE HISTORY OF MANNED SPACE EXPLORATION

1. **Performance.** Discuss the History of Manned Space Exploration.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall discuss the history of manned space exploration, to include:
 - a. the Mercury program,
 - b. the Gemini program,
 - c. the Apollo program, and
 - d. the Russian manned space program.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Discuss the Mercury program, to include: <ol style="list-style-type: none"> a. objectives of the program, and b. history of the program. 	Interactive Lecture	5 min	C3-183 (pp. 22–25)
TP2	Discuss the Gemini program, to include: <ol style="list-style-type: none"> a. objectives of the program, and b. history of the program. 	Interactive Lecture	5 min	C3-183 (p. 26, p. 27)
TP3	Discuss the Apollo program, to include: <ol style="list-style-type: none"> a. objectives of the program, and b. history of the program. 	Interactive Lecture	5 min	C3-183 (pp. 28–31)
TP4	Discuss the Russian manned space program, to include: <ol style="list-style-type: none"> a. the Vostok missions, b. the Soyuz missions, and c. the Salyut and Mir space stations. 	Interactive Lecture	10 min	C3-183 (p. 22, p. 23, p. 32, p. 33, p. 40, p. 41)

5. **Time**
 - a. Introduction/Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets, generate interest, present background material, and clarify the history of manned space exploration.
7. **References.** (ISBN 978-0-75662-227-5) Graham, I. (2006). *Space Travel*. New York, NY: DK Publishing, Inc.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** Space race timeline handout.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO C340.01 – IDENTIFY CANADIAN ASTRONAUTS

1. **Performance.** Identify Canadian Astronauts.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify Canadian astronauts, to include:
 - a. Marc Garneau,
 - b. Roberta Bondar,
 - c. Steve MacLean,
 - d. Chris Hadfield,
 - e. Robert Thirsk,
 - f. Bjarni Trygvassen,
 - g. David Williams, and
 - h. Julie Payette.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Discuss the professional and personal profiles of Canadian astronauts, to include: <ol style="list-style-type: none"> a. missions, b. place and date of birth, c. education, d. professional experience, e. special honours, and f. affiliations. 	Interactive Lecture	50 min	C3-238

5. **Time**
 - a. Introduction/Conclusion: 10 min
 - b. Interactive Lecture: 50 min
 - c. Total: 60 min

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to Canadian astronauts, to generate interest in Canada's space program, and to emphasize the teaching points.
7. **Reference.** C3-238 Canadian Space Agency. (2008). *Canadian Space Agency*. Retrieved February 9, 2008, from <http://www.space.gc.ca/asc/eng/default.asp>.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks**
 - a. The instructor shall obtain the latest biographical information for this EO. This material must be updated each year to reflect the Canadian Space Agency's recent activities.
 - b. The two astronauts discussed in EO M340.01 (Identify Canadian Astronauts) will not be repeated in this lesson.

EO C340.02 – DISCUSS THE CANADIAN SPACE PROGRAM

1. **Performance.** Discuss the Canadian Space Program.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall discuss the Canadian space program, to include:
 - a. technologies, and
 - b. missions.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Describe Canada's involvement in space technologies, to include: <ol style="list-style-type: none"> a. the David Florida Laboratory (DFL), b. the Canadian Analogue Research Network (CARN), and c. partnerships with the Canadian Space Agency (CSA). 	Interactive Lecture	10 min	C3-238
TP2	Describe CSA missions, to include: <ol style="list-style-type: none"> a. telecommunications, b. earth observation, c. space exploration, and d. space medicine. 	Interactive Lecture	15 min	C3-238

5. **Time**
 - a. Introduction/Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to the Canadian space program and to generate interest.
7. **References.** C3-238 Canadian Space Agency. (2008). *Canadian Space Agency*. Retrieved February 9, 2008, from <http://www.space.gc.ca/asc/eng/default.asp>.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** This material must be updated each year to reflect CSA progress.

EO C340.03 – DISCUSS UNMANNED SPACE EXPLORATION

1. **Performance.** Discuss Unmanned Space Exploration.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall discuss unmanned space exploration, to include:
 - a. Sputnik,
 - b. Explorer,
 - c. missions to planets within the solar system, and
 - d. Voyager.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Describe the history of earth satellites, to include: <ol style="list-style-type: none"> a. the development of launch capability, b. the Soviet Sputnik mission, and c. the United States' Explorer mission. 	Interactive Lecture	15 min	C3-240
TP2	Describe the twin Voyager spacecraft, to include: <ol style="list-style-type: none"> a. the planetary voyage, b. the interstellar mission, and c. the golden record. 	Interactive Lecture	20 min	C3-239

TP	Description	Method	Time	Ref
TP3	Describe unmanned space exploration, to include: a. missions to planets within the solar system, to include: (1) the Phoenix Mars mission, to include: (a) mission characteristics, and (b) Canada's lidar weather station; and (2) the Cassini-Huygens mission, to include: (a) mission summary, (b) Huygens' descent to Titan, and (c) Cassini orbiter flybys.	Interactive Lecture	20 min	C3-238 C3-241 C3-242

5. Time

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 55 min |
| c. Total: | 60 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to unmanned space exploration, generate interest, and emphasize the teaching points.

7. References

- a. C3-238 Canadian Space Agency. (2008). *Canadian Space Agency*. Retrieved February 9, 2008, from <http://www.space.gc.ca/asc/eng/default.asp>.
- b. C3-239 NASA. (2008). *Voyager: The Interstellar Mission*. Retrieved February 9, 2008, from <http://voyager.jpl.nasa.gov/index.html>.
- c. C3-240 NASA. (2007). *Sputnik: The Fiftieth Anniversary*. Retrieved February 9, 2008 from <http://history.nasa.gov/sputnik/>.
- d. C3-241 European Space Agency. (2008). *Cassini-Huygens Homepage*. Retrieved February 9, 2008, from <http://huygens.esa.int/science-e/www/area/index.cfm?fareaid=12>.
- e. C3-242 NASA. (2008). *NASA Cassini-Huygens Homepage*. Retrieved February 9, 2008, from <http://saturn.jpl.nasa.gov/home/index.cfm>.
- f. C3-251 European Space Agency. (2008). *ESA: Multimedia Gallery Videos. Moons*. Retrieved April 5, 2008, from <http://www.esa.int/esa-mm/mmg.pl?mission=Cassini-Huygens&type=V>.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks**
 - a. TP 2 must be updated each year to reflect current events.
 - b. Model kits of spacecraft may be purchased online as training aids.

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EO C340.04 – DESCRIBE ELEMENTS OF THE NIGHT SKY

1. **Performance.** Describe Elements of the Night Sky.
2. **Conditions**
 - a. Given:
 - (1) Celestial reference sheets,
 - (2) Supervision, and
 - (3) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall describe elements of the night sky, to include:
 - a. constellations,
 - b. planets, and
 - c. other celestial bodies.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Describe fixed elements of the night sky, to include: <ol style="list-style-type: none"> a. visible stars, and b. constellations. 	Interactive Lecture	15 min	C3-179 (pp. 120–135)
TP2	Describe moving objects of the night sky, to include: <ol style="list-style-type: none"> a. satellites, and b. planets. 	Interactive Lecture	10 min	C3-180 C3-221

5. **Time**
 - a. Introduction/Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min
6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to elements of the night sky, to generate interest and emphasize the teaching points.
7. **References**
 - a. C3-179 (ISBN 1-55209-302-6) Dickenson, T. (2001). *Night Watch: A Practical Guide to Viewing the Universe*. Willowdale, ON: Firefly Books.
 - b. C3-180 (ISBN 1-55297-853-2) Scagell, R. (2004). *Firefly Planisphere: Latitude 42 Degrees North*. Willowdale, ON: Firefly Books.

- c. C3-221 National Research Council of Canada. (2007). *Explore the Night Sky*. Retrieved December 3, 2007, from <http://www.nrc-cnrc.gc.ca/eng/education/astronomy/constellations/html.html>.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** Handout of celestial reference sheets showing constellations.
10. **Test Details.** N/A.
11. **Remarks.** This EO may be conducted with EO C390.09 (Identify Elements of the Night Sky, Section 19).

EO C340.05 – SIMULATE LIFE IN SPACE

1. **Performance.** Simulate Life in Space.
2. **Conditions**
 - a. Given:
 - (1) Space food,
 - (2) Rinseless soap,
 - (3) Work gloves,
 - (4) 1/2-inch National Coarse nuts and bolts,
 - (5) Supervision, and
 - (6) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall simulate life in space, to include:
 - a. exercising;
 - b. working;
 - c. washing hands; and
 - d. sampling space food.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	<p>Explain the medical effects of weightlessness and have the cadets simulate exercises that astronauts must perform to maintain bone density and muscle mass, to include:</p> <ol style="list-style-type: none"> a. stretching and warm up exercises; b. strengthening exercises; and c. cool down exercises. 	Practical Activity	35 min	C3-183 (p. 44, p. 45)
TP2	<p>Explain the challenges of living in space and have the cadets simulate aspects of life in space by:</p> <ol style="list-style-type: none"> a. washing their hands with rinseless soap; and b. sampling space food. 	In-Class Activity	30 min	C3-183 (p. 48, p. 49)
TP3	<p>Have the cadets simulate working in space by installing a nut on a bolt wearing two pairs of thick work gloves.</p>	In-Class Activity	20 min	C3-183 (p. 50, p. 51)

5. **Time**

a. Introduction/Conclusion:	5 min
b. Practical Activity:	35 min
c. In-Class Activity:	50 min
d. Total:	90 min

6. **Substantiation**

- a. A practical activity was chosen for TP 1 as it is an interactive way to allow cadets to experience some aspects of life in space. This activity contributes to the development of knowledge of life in space in a fun and challenging setting.
- b. An in-class activity was chosen for TPs 2 and 3 as it is an interactive way to provoke thought and simulate some of the challenges of living in space.

7. **References.** C3-183 (ISBN 978-0-75662-227-5) Graham, I. (2006). *Space Travel*. New York, NY: DK Publishing, Inc.

8. **Training Aids**

- a. Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area,
- b. Space food (eg, freeze-dried ice cream, freeze-dried strawberries),
- c. Rinseless soap,
- d. Work gloves, and
- e. 1/2-inch National Coarse nuts and bolts.

9. **Learning Aids**

- a. Space food (eg, freeze-dried ice cream, freeze-dried strawberries),
- b. Rinseless soap,
- c. Work gloves, and
- d. 1/2-inch National Coarse nuts and bolts.

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

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

EO C340.06 – LAUNCH A WATER ROCKET

1. **Performance.** Launch a Water Rocket.
2. **Conditions**
 - a. Given:
 - (1) One-litre plastic bottle,
 - (2) Construction paper,
 - (3) Scissors,
 - (4) Glue,
 - (5) Putty or modeling clay,
 - (6) Air pump with pressure gauge,
 - (7) Launch pad,
 - (8) Drinking straws,
 - (9) Packing tape,
 - (10) 3-mm string,
 - (11) Safety glasses,
 - (12) Supervision, and
 - (13) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Outdoor area 10 m by 20 m with controlled access.
3. **Standard.** The cadet, as a member of a group of no more than four, shall:
 - a. construct a water rocket; and
 - b. launch the water rocket.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Supervise as the cadets construct a water rocket, that includes: <ol style="list-style-type: none"> a. fuselage, b. stabilizing fins, c. nose cone, d. centre of gravity trimming, and e. decorations. 	Practical Activity	20 min	C3-016 (pp. 81–83)
TP2	Supervise the cadets launching the water rockets.	Practical Activity	50 min	C3-016 (pp. 77–79)

TP	Description	Method	Time	Ref
TP3	Conduct an activity debriefing, to include: a. characteristics of the successful launches; and b. rocket behaviour under Newton's Laws.	Group Discussion	10 min	C3-016 (pp. 21–23)

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 10 min |
| b. Practical Activity: | 70 min |
| c. Group Discussion: | 10 min |
| d. Total: | 90 min |

6. **Substantiation**

- A practical activity was chosen for TPs 1 and 2 as it is an interactive way to introduce cadets to water rockets. This activity contributes to the understanding of rocketry in a fun and challenging setting.
- A group discussion was chosen for TP 3 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions, and feelings about water rockets.

7. **Reference.** C3-016 (ISBN EG-2003-01-108-HQ) NASA. (2003). *Rockets: A Teacher's Guide With Activities in Science, Mathematics, and Technology*. Washington, DC: NASA.

8. **Training Aids.** Safety glasses.

9. **Learning Aids**

- Instructions for constructing a water rocket,
- One-litre plastic bottle,
- Construction paper,
- Scissors,
- Glue,
- Putty or modeling clay,
- Air pump with pressure gauge,
- Launch pad,
- Drinking straws,
- Packing tape,
- 3-mm string, and
- Safety glasses.

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

11. **Remarks**

- Prior to this lesson, instructors shall prepare a launching platform and guidance system.

- b. The launching pad should be saved for future training.
- c. Each group shall be allowed a number of attempts to achieve a successful launch.
- d. If a suitable location for this launching water rockets is not available at the squadron's training facility, that part of the lesson can be carried out as part of a field exercise.

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EO C340.07 – IDENTIFY GLOBAL POSITION SYSTEM (GPS) COMPONENTS

1. **Performance.** Identify Global Position System (GPS) Components.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify GPS components, to include:
 - a. satellites,
 - b. control stations, and
 - c. receivers.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Explain how the GPS operates, to include: <ol style="list-style-type: none"> a. the three components of GPS, to include: <ol style="list-style-type: none"> (1) satellites, (2) control stations, and (3) receivers; b. trilateration from three satellites, and c. timing radio signals. 	Interactive Lecture	25 min	A2-041 C3-243 C3-244
TP2	Describe the constellation of 24 GPS satellites, to include: <ol style="list-style-type: none"> a. orbit characteristics, b. station-keeping manoeuvres, and c. on-board GPS equipment. 	Interactive Lecture	5 min	C3-243 C3-244
TP3	Describe the network of earth-based control stations, to include: <ol style="list-style-type: none"> a. five monitor stations, b. three ground antennas, and c. the master control station (MCS). 	Interactive Lecture	5 min	C3-243 C3-244

TP	Description	Method	Time	Ref
TP4	Describe the user receivers, to include: a. time correction for the user receiver, and b. user receiver applications, to include: (1) locating, (2) navigating, (3) tracking, (4) mapping, and (5) timing.	Interactive Lecture	15 min	C3-243 C3-244

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 10 min |
| b. Interactive Lecture: | 50 min |
| c. Total: | 60 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to GPS components, to generate interest, and emphasize the teaching points.

7. **References**

- a. A2-041 B-GL-382-005/PT-001 Canadian Forces. (2006). *Maps, Field Sketching, Compasses and the Global Positioning System*. Ottawa, ON: Department of National Defence.
- b. C3-243 US Naval Observatory. (2008). *USNO GPS Timing Operations*. Retrieved February 10, 2008, from <http://tycho.usno.navy.mil/gps.html>.
- c. C3-244 Trimble Navigation Limited. (2006). *GPS Tutorial*. Retrieved February 10, 2008, from <http://www.trimble.com/gps/index.shtml>.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.

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

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

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

EO C340.08 – DESCRIBE ASPECTS OF THE INTERNATIONAL SPACE STATION (ISS)

1. **Performance.** Describe Aspects of the International Space Station (ISS).
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall describe aspects of the ISS, to include:
 - a. major components, and
 - b. missions.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Describe the major components of the ISS, to include: <ol style="list-style-type: none"> a. Zarya, b. Unity, c. Zvezda, d. Harmony e. Destiny, f. Multi-Purpose Logistics Modules (MPLMs), g. Kibo, h. Columbus, i. Automated Transfer Vehicles (ATVs), and j. the Mobile Servicing System (MSS). 	Interactive Lecture	15 min	C3-245
TP2	Discuss ISS missions, to include: <ol style="list-style-type: none"> a. Materials International Space Station Experiment (MISSE), b. Minus Eighty Degrees Celsius Laboratory Freezer for ISS (MELFI), c. Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES), and d. online viewing of ISS missions on NASA TV. 	Interactive Lecture	10 min	C3-245 C3-246

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to aspects of the ISS, to generate interest, and emphasize the teaching points.

7. **References**

- a. C3-245 NASA. (2008). *International Space Station*. Retrieved February 10, 2008, from http://www.nasa.gov/mission_pages/station/main/index.html.
- b. C3-246 NASA. (2008). *NASA TV*. Retrieved February 12, 2008, from <http://www.nasa.gov/multimedia/nasatv/index.html>.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.

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

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

11. **Remarks**

- a. A model of the ISS would make an ideal visual aid for this lesson. Scale models may be purchased through online resources or ordered at the local hobby store.
- b. In lieu of a model, a large poster would make an great visual aid. Images and multimedia are available through online resources, including NASA.

EO C340.09 – PARTICIPATE IN A PRESENTATION GIVEN BY A GUEST SPEAKER FROM THE ASTRONOMY COMMUNITY OR AEROSPACE INDUSTRY

1. **Performance.** Participate in a Presentation Given by a Guest Speaker From the Astronomy Community or Aerospace Industry.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall participate in a presentation given by a guest speaker from the astronomy community or aerospace industry.
4. **Teaching Points.** The guest speaker is asked to:
 - a. describe their role;
 - b. familiarize the cadets with:
 - (1) occupations,
 - (2) educational institutions, and
 - (3) advantages of being engaged in the astronomy community or aerospace industry; and
 - c. 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 was chosen for this lesson to review, emphasize and summarize the teaching points.
7. **References.** N/A.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks**
 - a. Training aids should be determined by contacting the guest speaker prior to the presentation.
 - b. If the guest speaker cannot discuss all the occupations in their respective community/industry, they can focus on their own occupation.
 - c. There is no instructional guide for this EO.

EO C340.10 – IDENTIFY ONLINE STARGAZING PROGRAMS

1. **Performance.** Identify Online Stargazing Programs.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify online stargazing programs, to include:
 - a. NASA's SkyView, and
 - b. SKY-MAP.ORG.
4. **Teaching Points**

TP	Description	Method	Time	Ref
TP1	Discuss NASA's SkyView, to include: <ol style="list-style-type: none"> a. how to access, and b. SkyView's Non-Astronomers page. 	Interactive Lecture	5 min	C3-231
TP2	Discuss SKY-MAP.ORG, to include: <ol style="list-style-type: none"> a. purpose, and b. how to access. 	Interactive Lecture	5 min	C3-230
TP3	Explain the SKY-MAP.ORG user interface, to include: <ol style="list-style-type: none"> a. program control features, and b. catalogues and databases available for access. 	Interactive Lecture	15 min	C3-230

5. **Time**

a. Introduction/Conclusion:	5 min
b. Interactive Lecture:	25 min
c. Total:	30 min
6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets, generate interest, present background material, and clarify online stargazing.
7. **References**
 - a. C3-230 ET.SKY-MAP. (2008). *SKY-MAP.ORG*. Retrieved February 8, 2008, from <http://sky-map.org/>.

- b. C3-231 NASA HEASARC. (2008). *SkyView*. Retrieved February 8, 2008, from <http://skyview.gsfc.nasa.gov/>.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** N/A.