



PILOTING PRACTICE



FITNESS AND NUTRITION

MISSION DESCRIPTION

For this mission, astronaut crews will use basic communication skills while performing a physically challenging task. Crews must communicate succinctly with their team members to accomplish a goal. Astronauts must also communicate with their crewmembers if they become fatigued and need to switch positions.

Difficulty: **EASY**

Duration: **20 MINUTES**

Materials: **MODERATE**

MISSION PREPARATION

TIMELINE

Breakdown	Duration
Background	2 minutes
Educator's instructions/demonstration	5 minutes
Group activity	10 minutes
Wrap-up	3 minutes
Total	20 minutes

GOALS

Simulate piloting a Soyuz spacecraft by giving precise instructions to teammates.

OBJECTIVES

By the end of the mission, participants will be able to

MATERIALS

- One ball that is approximately 25 centimetres wide (a basketball or equivalent sized ball)
- One 10-metre (or longer) measuring tape
- Instruction sheet for each team (see participant handout)
- One orange cone per team

- Communicate information clearly, succinctly and precisely
- Concentrate and remember tasks while under stress
- Evaluate their cardiovascular and muscular endurance



BACKGROUND

Astronauts use the Russian Soyuz vessel to dock with the International Space Station (ISS). The Soyuz spacecraft can carry up to three people: a commander, a co-pilot, and a flight engineer or cosmonaut researcher. Canadian Space Agency astronaut David Saint-Jacques was the co-pilot for his recent mission to the ISS.

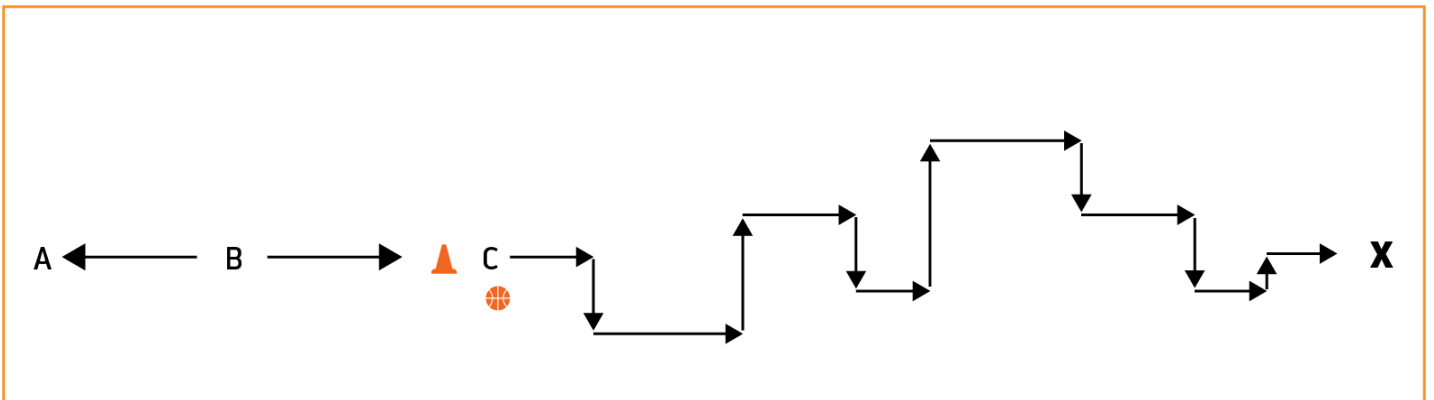
To ensure the success of the space flight, the astronauts are constantly in contact with the capsule communicator, or capcom, back on Earth. Time is of the essence during space missions, and there is no room for error or interpretation. The capcom must relay complex information from the flight director in a clear and concise manner.

Mission control sends commands to the on-board computer to put the Soyuz on the right trajectory to rendezvous with the ISS. If everything goes according to plan, the Soyuz automatically docks itself. However, if the radar fails, astronauts must use the optical sighting device to dock manually. This is when countless hours spent in a simulator come in handy! Once the spacecraft has docked with the ISS, the air pressure on board the Soyuz is equalized with that of the Station. The airlock is then opened, and the newcomers can join their colleagues who are already on the ISS.

SET-UP

- Use a play space suitable for running with a sturdy wall.
- Place a cone or other marker at least three metres from the wall. If using cone, place each team's ball on top of the cone.

LAYOUT



MISSION INSTRUCTIONS

1. Form astronaut crews of three people. Each crew gets one basketball and one set of instructions.
2. Each crewmember must decide their role:
 - a) **Flight director:** Performs a wall squat while whispering instructions to the capcom.
 - b) **Capcom:** Receives information from the flight director, runs to the pilot, relays the information, and runs back to the flight director to receive more instructions.
 - c) **Pilot:** Receives information from the capcom and moves the basketball accordingly.
3. Once crewmembers have been assigned positions, they can get into place. The pilot's starting point is the cone.
4. The flight director will perform a wall squat and whisper information to the capcom.
5. The capcom will run to the pilot and relay the same information.
6. The pilot will move the ball according to their specific instructions provided in the participant handout.
7. If at any time a crewmember cannot perform their assigned task due to fatigue, the crew must change positions. The flight director becomes the capcom, the capcom becomes the pilot, and the pilot becomes the flight director.
8. Repeat until there are no more instructions and the spacecraft has reached its destination. The pilot stays with the spacecraft in the final position.
9. The activity organizer can measure the distance the spacecraft has travelled, compare it with the instruction cards, and inform the team if they reached the correct destination.

Note: Each crew will have a different distance to travel according to the provided instruction cards (see participant handout).

ANSWER KEY FOR ACTIVITY FACILITATOR

Distance each team should travel:

- **Red team:** 5 metres
- **Blue team:** 7 metres
- **Yellow team:** 8 metres
- **Green team:** 10 metres

● Instructions for Flight Director of the Red Team

- The flight director transmits these directions to the capcom.
- The capcom transmits these directions to the pilot.
- The pilot will move the capsule (ball) accordingly.

1. 5 rotations forward
2. 3 rotations to the right
3. 4 rotations forward
4. 2 rotations to the left
5. 6 rotations forward
6. 3 rotations to the left
7. 4 rotations forward
8. 4 rotations to the right
9. 2 rotations forward
10. 3 rotations to the left
11. 2 rotations forward
12. 3 rotations to the right
13. 3 rotations forward
14. 2 rotations to the left
15. 2 rotations forward

● Instructions for Flight Director of the Blue Team

- The flight director transmits these directions to the capcom.
 - The capcom transmits these directions to the pilot.
 - The pilot will move the capsule (ball) accordingly.
1. 3 rotations forward
 2. 4 rotations to the right
 3. 2 rotations forward
 4. 3 rotations to the left
 5. 6 rotations forward
 6. 5 rotations to the left
 7. 3 rotations forward
 8. 5 rotations to the right
 9. 2 rotations forward
 10. 4 rotations to the left
 11. 2 rotations forward
 12. 5 rotations to the right
 13. 1 rotation forward
 14. 2 rotations to the left
 15. 1 rotation forward

● **Instructions for Flight Director of the Yellow Team**

- The flight director transmits these directions to the capcom.
- The capcom transmits these directions to the pilot.
- The pilot will move the capsule (ball) accordingly.

1. 5 rotations forward
2. 3 rotations to the right
3. 5 rotations forward
4. 2 rotations to the left
5. 6 rotations forward
6. 3 rotations to the left
7. 5 rotations forward
8. 3 rotations to the right
9. 3 rotations forward
10. 2 rotations to the left
11. 2 rotations forward
12. 2 rotations to the left
13. 3 rotations forward
14. 1 rotation to the left
15. 3 rotations forward

● Instructions for Flight Director of the Green Team

- The flight director transmits these directions to the capcom.
- The capcom transmits these directions to the pilot.
- The pilot will move the capsule (ball) accordingly.

1. 6 rotations forward
2. 2 rotations to the left
3. 6 rotations forward
4. 1 rotation to the left
5. 6 rotations forward
6. 2 rotations to the left
7. 5 rotations forward
8. 1 rotation to the right
9. 3 rotations forward
10. 1 rotation to the left
11. 6 rotations forward
12. 2 rotations to the right
13. 3 rotations forward
14. 1 rotation to the left
15. 5 rotations forward