MAEL/AEL - INTERNATIONAL SPACE STATION MISSION

Welcome. You are about to participate in one of humankind's most exciting and challenging adventures. You are about to conduct a mission aboard the International Space Station currently in orbit around Earth.

A huge team effort is required to conduct any space mission so it will be important for you to work well with your partner as you conduct this mission.

Also, due to the complexity of this mission, it will be important for you to follow the instructions contained on these task cards carefully to assure mission success.

The next task card describes your mission objectives.

Turn to the Next Task Card

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Mission Objectives

Objective #1 - Your mission will begin with Flight Training. During this training period, you will learn how to use the Flightstick and throttle to fly the Orbiter. You will also learn how to use the pushbutton panel to control special functions of the Orbiter.

Objective #2 - You will maneuver the Orbiter near the International Space Station to search for a pressure leak in one of the ISS modules. You will then utilize a photograph of the International Space Station to identify the name of this module

Objective #3 - Finally, if you still have time and don't run out of fuel, you will maneuver around the International Space Station to search for one of the Russian Research Modules. Once you locate it, you will try to identify the markings on it.

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Crew Responsibilities

Your crew for this mission consists of two positions in the Orbiter. They are …

Commander: Onboard the Orbiter, the commander is in charge of the mission and flies the vehicle.

Pilot: Onboard the Orbiter, The Pilot is second-in-command. The Pilot reads the task cards aloud, fills in the pilot's log worksheet, and assists the commander in flying the orbiter whenever necessary.

Now you are ready to begin your mission. Your Step-By-Step instructions begin on the next task card. Have a great flight.

Turn to the Next Task Card

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Step-by-Step Tasks

1. As a team, decide which of you will be the Commander first. Have this person sit in the space simulator cockpit. The other student (The Pilot) will sit next to the Commander in the chair provided.

2. As a team, review the vocabulary words on the next two pages. You will encounter these words during your mission and this review may help you discover and understand the meaning of unfamiliar words.

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VOCABULARY:

Attitude Direction Indicator (ADI) – An instrument in an aircraft or spacecraft which indicates the current attitute (Pitch, Roll, Yaw) of the vehicle.

Cockpit - the place where pilots sit to fly the Orbiter, containing the instruments and controls.

Commander – In the Shuttle program, the commander files the Orbiter and has command of the mission.

Flight stick – A control that the Commander and Pilot uses onboard the Orbiter to maneuver the vehicle through the air or thorough space.

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VOCABULARY (CONTINUED):

Orbiter – A manned Space Vehicle designed to be launched into orbit, carry out a specific mission, and then land on a conventional runway on Earth.

Pilot – In the Shuttle program, the Pilot assists the commander in flying the Orbiter. In the shuttle program, the Pilot performs the duties of "Co-Pilot" in an aircraft.

Reaction Control System (RCS) engines – Tiny engines on the Front and back of the Orbiter which are used to maneuver the vehicle.

Rotation – Rotation is movement around a single Axis in 3-dimensions.

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Mission Objective #1 (Flight Training) - Piloting the Orbiter in Space is more difficult than piloting an aircraft near Earth's surface. Since there is virtually no friction in Space, every movement of the Orbiter must be carefully controlled by firing small engines in the Nose and tail portions of the vehicle. Your Flightstick controls which engines fire, and the throttle controls the maximum thrust provided by those engines.

Before you learn how to maneuver your vehicle, you'll need to learn how to precisely control the power generated by your engines.

Turn to the Next Task Card

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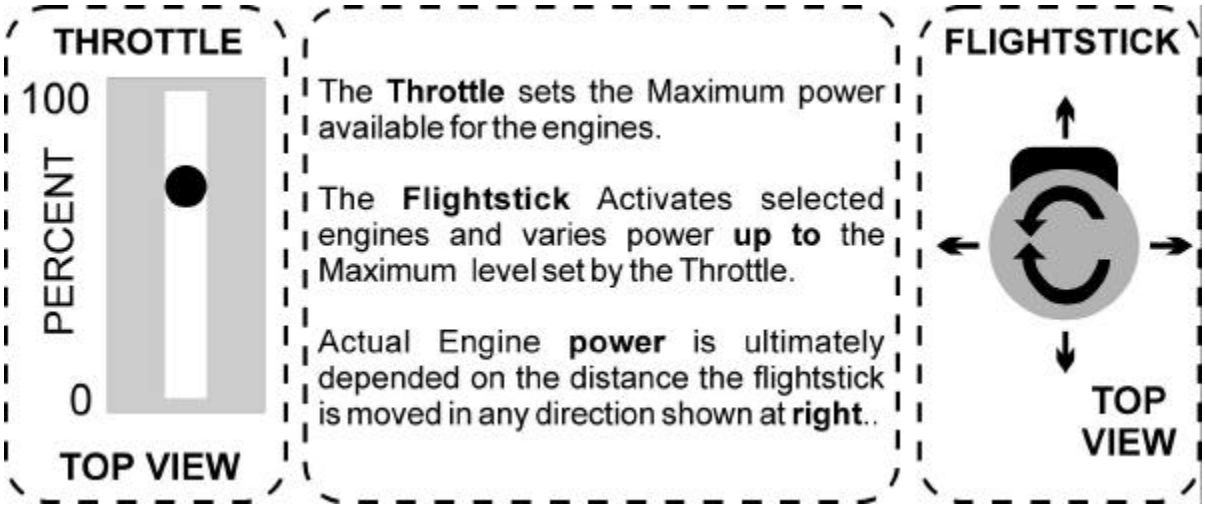
Controlling Engine Power



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Commander – Press the Flightstick Trigger button to begin your mission.

The Space Shuttle has delivered the Orbiter into Orbit and the International Space Station should be in view in your large windows in front of you.

The Orbiter is capable of two types of Maneuvers – Rotation and Translation. Next, you will learn how these maneuvers affect the Orbiter's position and orientation. You will also have an opportunity to practice these maneuvers in preparation for your mission.

Commander – For these practice maneuvers, set the throttle to 25% (1/4 of the way up). This will limit your engine power to 25% of maximum to prevent you from moving too fast. Be sure to keep the International Space Station in view during this practice.

Next, you will learn how Translation maneuvers affects the Orbiter's position.

Turn to the Next Task Card

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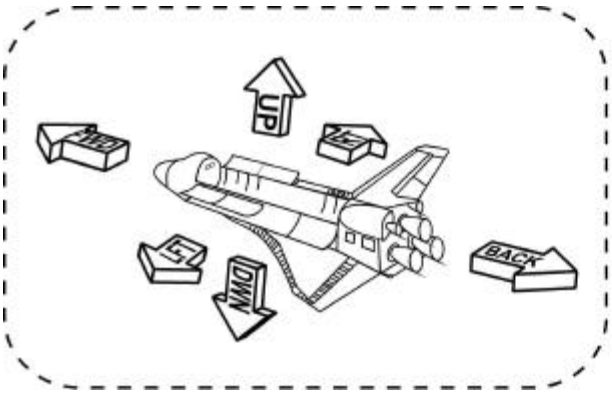
Orbiter Translation Maneuvers



Translation affects the Orbiter's movement in a straight line in any of the following directions -

Forward/Backward
Left/Right
Up/Down

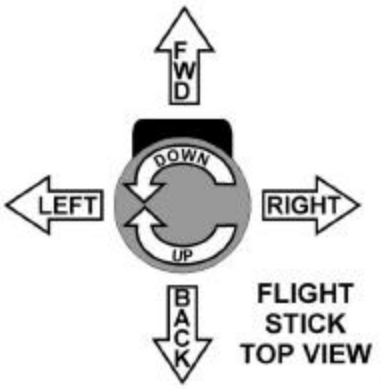
These movements are shown at left.

Next, you will practice these translation maneuvers yourself.

Turn to the Next Task Card

MAEL/AEL - INTERNATIONAL SPACE STATION MISSION
Orbiter Translation Maneuvers - Practice

Actual Orbiter Movement (Translation)



FLIGHT STICK TOP VIEW

Commander - Now you are ready to practice some translation maneuvers. Be sure that you DO NOT press the Flightstick Trigger during these maneuvers.

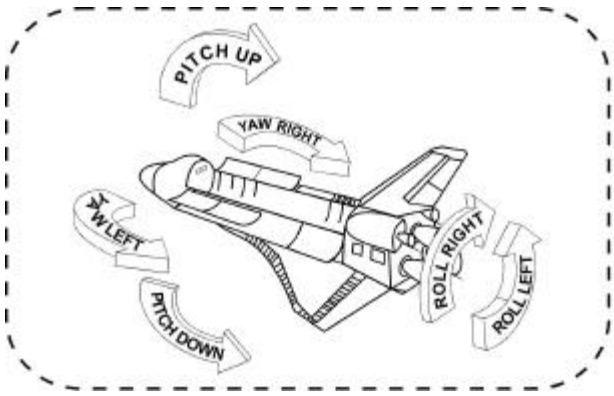
Grasp the Flightstick. For each movement of the Flightstick listed below, move the Flightstick as indicated, Hold for 2-seconds, and then return it to the center.

Left and Right
Forward and Back
Twist Left and Twist Right

Pilot - As the commander performs these maneuvers, check them off in your Pilot's log and for each maneuver, indicate which way they cause the Orbiter to move.

Turn to the Next Task Card

MAEL/AEL - INTERNATIONAL SPACE STATION MISSION
Orbiter Rotation Maneuvers



Rotation affects the Orientation of the Orbiter around the X, Y, or Z Axis in any of the following directions ...

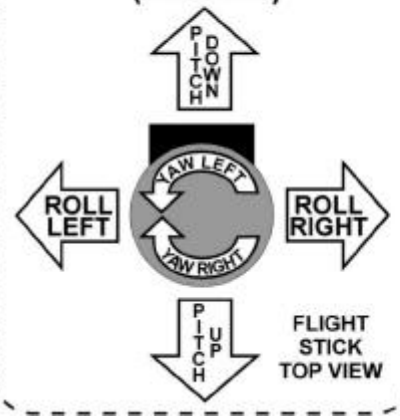
Pitch Up/Pitch Down
Roll Right/Roll Left
Yaw Left/Yaw Right

These movements are shown at left.

Turn to the Next Task Card

MAEL/AEL - INTERNATIONAL SPACE STATION MISSION
Orbiter Rotation Maneuvers - Practice

Actual Orbiter Movement (Rotation)



Commander - Now you are ready to practice some rotation maneuvers. YOU MUST press the Flightstick Trigger during these maneuvers.

Grasp the Flightstick. For each movement of the Flightstick listed below, move the Flightstick as indicated, Hold for 2-seconds, and then return it to the center.

Left and Right
Forward and Back
Twist Left and Twist Right

Pilot - As the commander performs these maneuvers, check them off in your Pilot's log and for each maneuver, indicate which way they cause the Orbiter to move.

Turn to the Next Task Card

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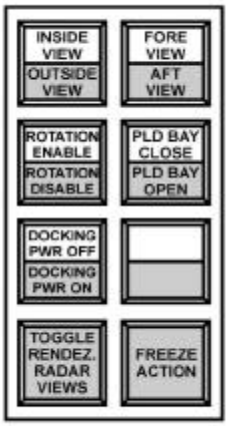

The Pushbuttons enable the commander to control a variety of Orbiter systems and functions.

These task cards will instruct you when to press a button using the following notation ...

Press [Docking Power Off] Pushbutton

To locate a particular pushbutton - return to this page to determine where it is on the pushbutton panel.

Warning - Your mission will be in Danger if you press any pushbutton before it is requested on the Task Cards.

Turn to the Next Task Card

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Commander – Throughout your mission, if you lose sight of the International Space Station in your "forward" view windows, and become unsure of where you are in space, you can use the Telemetry Radar to help yourself navigate back to it. The telemetry display is located in the upper right corner of your RIGHT window. The telemetry radar view shows the location and orientation of the International Space Station and the Shuttle from various viewpoints. Please note – Since the Telemetry Radar has a limited range, you will not be able to use it if you venture too far from the International Space Station.

Turn to the Next Task Card

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Commander – You can select various viewpoints on the Telemetry radar by pressing the following control panel button repeatedly.

Press [Toggle Rendez. Radar Views] to select different viewpoints

You are now ready to begin your actual mission objectives described on page 2 of these task cards.

Turn to the Next Task Card

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Commander – Move the throttle control one half of the way up (50%). This limits your engine thrust to 50% of maximum when you operate the Flightstick to fire the engines.

Commander – Begin a slow approach to the International Space Station by slowly moving the Flightstick Forward. Do not press the Flightstick Trigger button.

Mission Objective # 1 – A pressure leak has been detected in one of the International Space Station modules and you need to locate it. This leak can be seen as a colored mist coming out of one of the ISS modules. Navigate around the International Space Station until you (or the pilot) detect the location of the Pressure Leak.

Turn to the Next Task Card

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Pilot – Assist the pilot in locating the Pressure Leak. When the leak is detected, refer to the photograph of the International Space Station Assembly diagram to identify the International Space Station module that is leaking and write the module's name in your pilot's log.

Mission Objective # 2 – Your next task is to locate the two Russian Research modules attached to Universal Docking Module on the International Space Station. You should refer to the photograph of the International Space Station assembly diagram to determine the general location of these modules. These two Russian Research Modules are located near the large solar panels which are part of the Russian Science Power Platform.

Turn to the Next Task Card

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Commander – You are to navigate the orbiter to these two modules and determine if either one has any markings on them. You may need to get fairly close to each module to obtain the best view. If either does, you need to identify them.

Pilot – You need to help the pilot search for the two Russian Research Modules and determine of either one has markings on them. If either (or both) do, you need to describe the markings as best as you can in your Pilot's log.

STOP