

MARS

ONE THOUSAND ONE



fulldome/VR film background information



Around the year 2031 the World can finally witness the first attempt of a manned mission to Mars. The mission is named IRIS 1 and will last roughly one thousand days from launch till splash down back on Earth.

The IRIS 1 crew consists of six astronauts, three Men and three Women who are selected by the different international space agency partners for their professional skills needed during the journey and on the surface of the planet. Other characteristics of the crew are their resilience, flexibility and tolerance to face the conditions of confinement and sensory deprivation which they will have to endure during most of this historic journey.

The entire mission is presented by a reporter in the style of a live television broadcast starting on launch day at Kennedy Space Center.

After the successful launch the reporter will cover the rest of the mission from his Space headquarters Studio in New York.

Reporter character

Science/Space flight Reporter
Miles O'Brien

Supporting character (on launch day only)

Oldest son of Neil Armstrong
Rick Armstrong

Astronaut characters

Commander & Physician
Name: Robert McGee
Agency: NASA
Nationality: American

Command Module Pilot & Engineer
Name: Amy Lopez
Agency: NASA
Nationality: American

Mars Descend/Ascend Vehicle Pilot
Name: Otto Hoffman
Agency: ESA
Nationality: German

Astrobiologist & Botanist
Name: Daisy Evans
Agency: ESA
Nationality: English

Engineer & Mission Specialist
Name: Anatoly Nikolaev
Agency: ROSCOSMOS
Nationality: Russian

Geologist
Name: Sakiko Takahashi
Agency: JAXA
Nationality: Japanese

Mission Control Center main characters

Flight Director

Emily Kranz

Nationality: American

BME (Biomedical Engineer) flight controller

Crystal Hamilton

Nationality: American

CAPCOM (Capsule Communicator)

Rob Landis

Nationality: American

Music

A mission to Mars is an event of great historic significance as it is the first step to opening up a new World to humanity. An event of this magnitude happens only once every five hundred years in human history. It is comparable to the voyage of Columbus to the new World. Therefore the film deserves the best music ever created by man in the last five hundred years as a celebration to the achievement. Classical masterpieces from Beethoven, Dvorak, Vivaldi, Stravinsky and Bach will be synchronized to memorable moments during the mission.

Phases and events of the Mars Mission

Roll out of the SLS Rocket

At the start of the film we see the mighty SLS rocket with Exploration Upper Stage inside the Vehicle Assembly Building (VAB). It is the largest rocket ever created.

The doors of the VAB slowly open and the crawler, carrying the rocket and launch umbilical tower slowly starts moving taking the rocket out of the shade of the building and into the Florida sun. The camera flies out of the VAB revealing the entire impressive launch complex with all its activity.

(This scene will be synchronized to Beethoven's 7th symphony)

Launch

Reporter and sidekick are commenting on the launch at a safe distance near the countdown clock at Kennedy Space Center.

We switch briefly to Mission Control in Houston where the flight director gives a motivational speech to the flight controllers followed by the GO/NO GO calls for the launch.

We listen to the Public Affairs Officer during the final phase of the countdown. The launch commences from Platform 39B at the Kennedy Space Center. We see the Main engines start first, then the solid rocket boosters are ignited and the hold down arms release the rocket, the tower is cleared and Houston takes over control from Launch control.

After some time we see the solid rocket boosters being jettisoned and a little later the first stage is spent as well. The exploration upper stage is ignited and after negative return the Launch Escape System is jettisoned.

The camera continues to follow the Orion Command & Service Module all the way to its Earth orbit. The engine of the upper stage will shut down and the Orion Command & service Module will unfold its solar panels.

Then Orion will turn around and dock with the multi purpose logistics module which was carried as well on top of the upper stage of the SLS rocket.

The module contains consumables, fresh food and equipment. These items will be transferred to in the Mars Transfer Vehicle.

Docking with Mars Transfer Vehicle (MTV)

Docking takes place in orbit with the Mars Transfer Vehicle the astronaut's new home for most of the journey.

The Mars Transfer Vehicle was flown together and built in orbit over a period of several years mainly thanks to many launches of commercial launch vehicles and hardware from Space X, orbital ATK and Bigelow Aerospace.

Getting the MTV ready for the long journey

First the habitation module of the MTV is inflated by the astronauts. The consumables, food and equipment are transferred and several system checks are carried out to give a final okay to all systems of the MTV before it is cleared to leave low Earth Orbit. This phase might take a week or longer.

Trans Mars Injection

Houston will give a GO for the Trans Mars Injection. The reporter will brief the audience that only a few hours of the 1000 day mission is spend under powered flight and that during most of the mission the spacecraft is coasting without an engine running. The next TMI burn is a critical burn and when it is performed the astronauts will have crossed the point of no return. The least they will have to do in case of an emergency is circle Mars and return on a free return transfer orbit.

Artificial Gravity Spin-up

After the positive TMI burn the astronauts are about to get a luxury no space traveller has had before: artificial gravity.

The artificial gravity is achieved by spinning/rotating the spacecraft. The entire MTV should be at least 100 meters long with the habitation module at one end.

After spin up the gravity in the habitation module will not be 1G but 0.38 G similar to Mars Gravity.

Seven Months coasting to Mars

The long journey to Mars has commenced, we see the astronauts, working, sleeping and walking around in simulated Mars Gravity. Daisy (Astrobiologist & Botanist) is tending the hydroponic growth chamber where she cultivates fresh vegetables as supplemental food for the crew.

Half way point to Mars

Daisy's young son (5 – 7 years old) is in the reporter's studio talking about his Mom (and his hope is that the engine of his Mom's spacecraft will still function on the way back) (cute scene, also shows the sacrifice Daisy is making by being away for nearly three years).

Coronal Mass Ejection emergency

Large CME is detected on the surface of the Sun, while the crew is sleeping. Speed and direction of the CME is calculated.

BME and Flight Director have a discussion about the safety of the crew. The flight director orders CAPCOM to wake up the crew and tell them to shut down all non critical equipment and seek shelter in their CME shelter. Which is basically an area of the habitat where they can cluster behind a water tank.

Crew spends many hours in their cramped CME shelter. After the storm Daisy worries that the hydroponic cultivated vegetables are damaged.

Mars Orbit Insertion

The rotation of the spacecraft is stopped so the Mars Orbit Insertion burn can be performed. After the burn the MTV is captured by Mars gravity and the crew admires the planet from orbit. These are the first human eyes on the New World.

(Music: Dvorak: New World Symphony).

After observing the planet from orbit and in particular the landing site to see if there are any dust storms developing, the Orion capsule is used by a part of the crew to dock with a Mars Descend Vehicle (MDV). The MDV was already positioned in Mars orbit before the arrival of the crew.

Entry Descend Landing, seven minutes of terror

The crew receives a GO from Mission Control for Entry Descend and Landing on Mars. Due to the communication latency caused by to the distance between Mars and Earth there is no direct communication possible with Mission Control during the landing. The moment mission control receives data of the de-orbit burn the crew has already landed.

Nepenthes Planum Base Camp with prepositioned modules.

A relative flat and safe landing site was chosen for the first mission. The area is called Nepenthes Planum. The MDV needs to land very close to prepositioned modules (like the habitation module and rover) in order to fulfill its surface mission.

This precision landing is done in a fully automatic way, the prepositioned modules transmit a localizer signal to the MDV to aid in its approach.

The last part of the landing is done with manual control by pilot Amy Lopez to avoid hitting any obstacle.

World celebrates

We see Time Square in New York packed with people who watched the landing on the big screens and celebrate together.

Mission Control

Flight controllers cheer, until Flight Director asks them to keep the chatter down as they have a STAY/NO STAY decision to make.

Surface Exploration Phase.

- First step by Commander Robert McGee followed by Daisy.
- Flag planting by both the Commander and Daisy. They plant the international flag of the World.
- Getting the habitation module ready, firing up the Radioisotope power system after positioning it at a safe distance from the Habitation module.
- Transferring rocket fuel to the Mars Ascend Vehicle for contingency. The rocket fuel has been produced by a chemical reaction using CO₂ from the Martian atmosphere during a two year process.
- Pressurized Rover deployment
- Surface Geology research and sample collection, drilling for subsurface samples.
- Visit to Curiosity Rover site
The crew will drive to the location of the Curiosity Rover in the Gale crater which landed there decades earlier.
(This is very similar to the Apollo 12 mission in 1969. The astronauts visited Surveyor 3 after a precision landing).
- Search for Sub surface water ice for establishing a future permanent base location
- The crew needs a break. Due to the length of day on Mars, they are exhausted. The length of day on Mars is roughly 40 minutes longer than on Earth. That does not sound like much but it adds up and results into skipping complete nights of sleep. The biorhythm of their bodies is still expecting 24 hour days.
- Search for potential microfossils. (They won't find any)

- Christmas on Mars
- Unscheduled visit to crippled Beagle 2 landing site. This is a wish of the English crew member Daisy who was inspired to become an astronaut by watching the British Beagle 2 landing broadcast when she was a young girl.
Upon arrival at the Beagle 2 landing site in Isidis Planitia Daisy unfolds the last two solar panels of the Beagle 2 symbolically completing the mission after nearly three decades and places a small Union Jack flag and a stuffed alien next to the Beagle 2.
(Two solar panels did not unfold in 2004 and had prevented the Beagle 2 from contacting Earth).
- Lift off from Mars with the Mars Ascend Vehicle. The surface phase is completed. Mars and Earth are again in opposition, the crew spent almost an entire orbit on Mars. The launch window to return to Earth has opened.

Docking with MTV

Docking with the MTV where the crew who made it to the surface is re-united with the crew who stayed behind in the MTV. The MAV is jettisoned and the crew prepares for Trans Earth Injection. In order to do so the MTV is pointed at the Earth (and Sun).
(Music: Face the Sun, James Blunt)

Trans Earth Injection

Another critical engine burn, if the engine does not work the crew is stuck in Mars orbit forever. Daisy thinks of her son, this was the part of the mission he feared the most. The engine burn works flawlessly, during the burn you can see Daisy is emotional and relieved. They are going home !

Earth Orbit Insertion of the MTV

The MTV can be re-used for a next Mars mission with another crew that's why the engine is fired to insert the MTV in Earth orbit.
The crew admires the Earth from orbit. It is incredibly beautiful and emotional to see the Earth again. They have been the only humans who have been separated from Earth for nearly three years. Due to a hurricane near their splashdown location they postpone the descend , the mission ends up being 1001 days long.
(Music: Libera boy choir, Going home)

Orion Re-entry

Spectacular re-entry of the Orion capsule with radio black out during hypersonic re-entry in the Earth's atmosphere. And drogue and main parachutes deployment.
(Music: Stravinsky, Firebird finale)

Splash Down

A very precise splash down in the Pacific near the recovery ship the USS Anchorage.

The Orion capsule is towed into the back of the USS anchorage (there is a submersed platform). We started the mission inside the VAB building with a giant rocket and we end inside the USS anchorage with only the Orion capsule left.