




MARS ORBITAL SPACE STATION

A HUB FOR INCOMING AND OUTGOING SCIENTISTS AND ASTRONAUTS. A FUTURE STAGING BASE FOR EXPLORATION OF MARS. A LABORATORY, ORBITAL OBSERVATION UNIT, SHORT & LONG TERM STORAGE. A MISSION.

PHASE 4: INJECTION

MOSS is successfully placed in a stable orbit. It is now ready and waiting to support follow-up manned missions and serve as a hub for Mars missions. MOSS acts as an outpost and storage facility for life support, fuel, and equipment that will make manned missions to this corner of space more feasible and safer.

-  $2.5e-5 < x < 5.0e-6$
-  $5.0e-6 < x < 2.0e-6$
-  $x < 2.0e-6$

CONNECTION

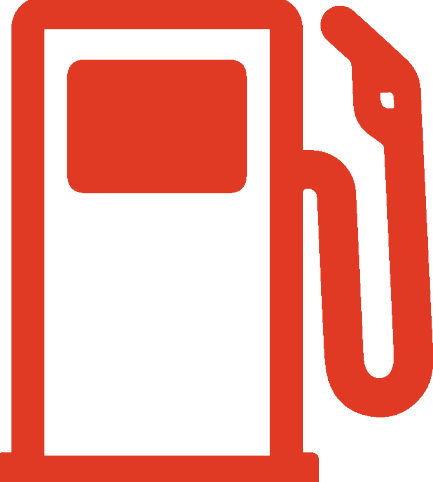
The success of the MOSS mission is reliant on stable communications with ground stations via the Deep Space Network. The allowable single bit error is presented above in red

 **30**
TERABYTES of data exchanged with stations on Earth, everyday.

PARKING

MOSS ENTERS MARS ORBIT

MOSS arrives with sufficient fuel and power resources to sustain the station and maintain orbit for follow-up missions. With a ΔV of 4563.04 m/s from the Hohmann transfer, 51,322kg of fuel will be needed to move the payload to Mars. MOSS will enter LMO upon its arrival.

 **79%**
of total fuel is used in the initial, 165 mil. mile hohmann transfer

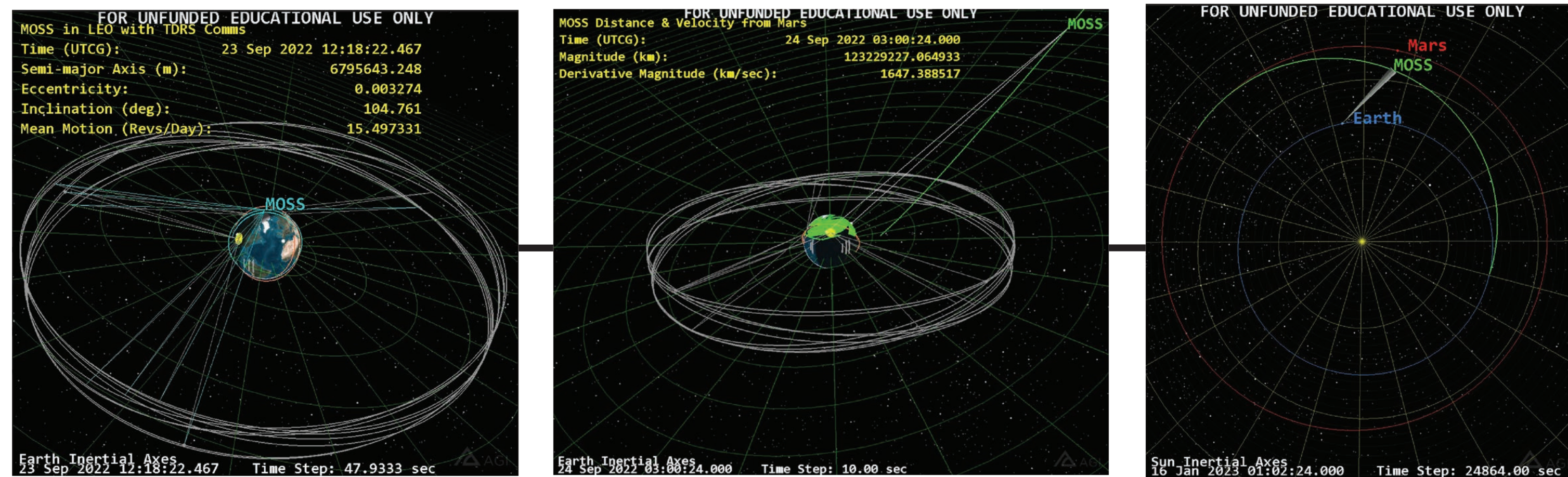
PHASE 3: TRANSFER

MOSS shall be transferred in an orbit that conserves fuel resources on the optimal trajectory for a transfer between the two planets.

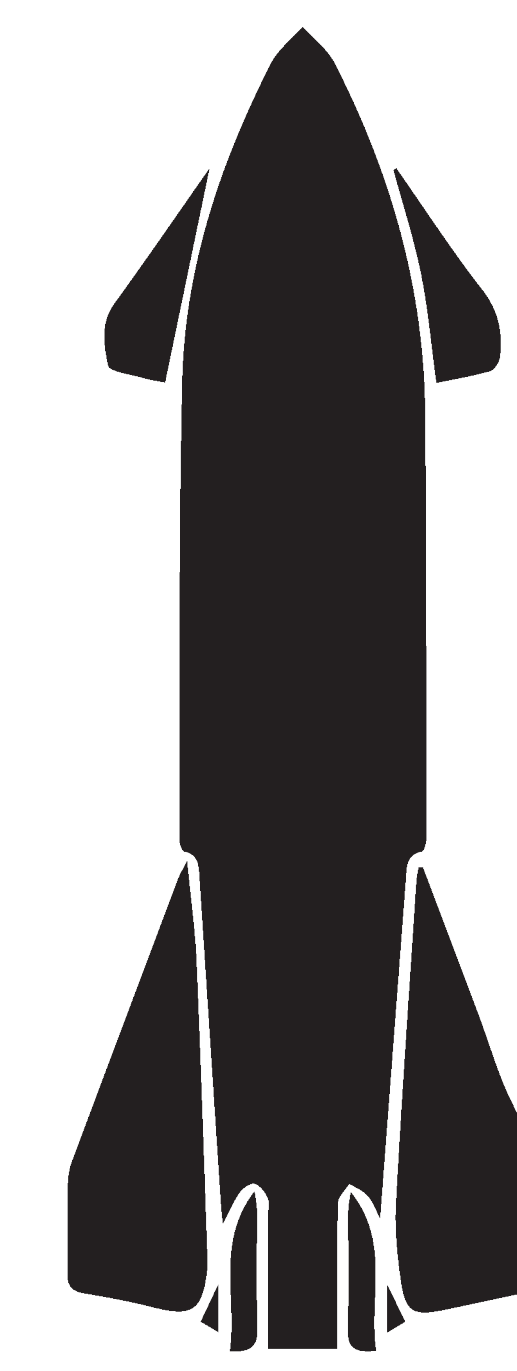
HOHMANN

TRANSFER FROM EARTH ORBIT TO MARS

Utilizing three X3 Ion Thrusters, the thrust required for MOSS to be placed into Mars' orbit would come at a cost of 300 kW. The figures below show the Hohmann Transfer of MOSS from LEO into Mars Orbit via the Systems Tool Kit software (STK).



The ISS is traveling at an orbital inclination of 51.6 degrees at an altitude of 400 km. The timing of the entire mission, from Earth-ISS modular launches, assembly, and ISS-Mars transfer, will be based on Mars's closest approach to Earth, which occurs every 160 days. Upon nearing Mars, the assembled will autonomously adjust its velocity and trajectory to achieve a circular orbit at an altitude of 425 km from the surface.



120 m
Height

90,000kg
MOSS mass

1500 tf
Starship Thrust



PHASE 1: LAUNCH

Launch responsibilities have been contracted out to SpaceX since it is the only entity with a large enough rocket to bring all parts of MOSS to LEO for construction in a single trip

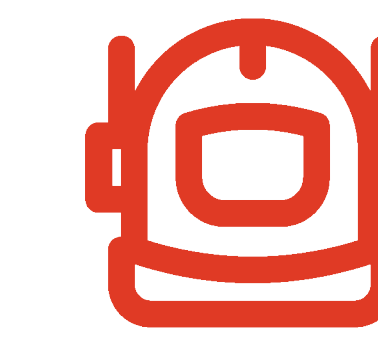
STARSHIP

SpaceX's STARSHIP & SUPERHEAVY ROCKET represent a fully reusable transportation system designed to carry both crew and cargo to orbit. Starship will have the ability to carry in excess of 100 metric tonnes to Earth orbit.

PREPARATION

THE ANSWER TO LIFE, THE UNIVERSE, & EVERYTHING

Launch will take place no later than June 16, 2022 in order to make launch and assembly window. All entities will be brought to orbit in a single trip. A 42 day window is provided to prepare all components in Starship for launch.



7 ASTRONAUTS

Minimum 3 astronauts for mission survival- Transfer will be made unmanned.

COMMUNICATION

USING ULTRA-HIGH FREQUENCY

While in orbit, communication and control with Earth will be facilitated using the same satellites in GEO as the ISS. All signals in LEO are first sent to communications satellites at much higher altitudes in geosynchronous orbit

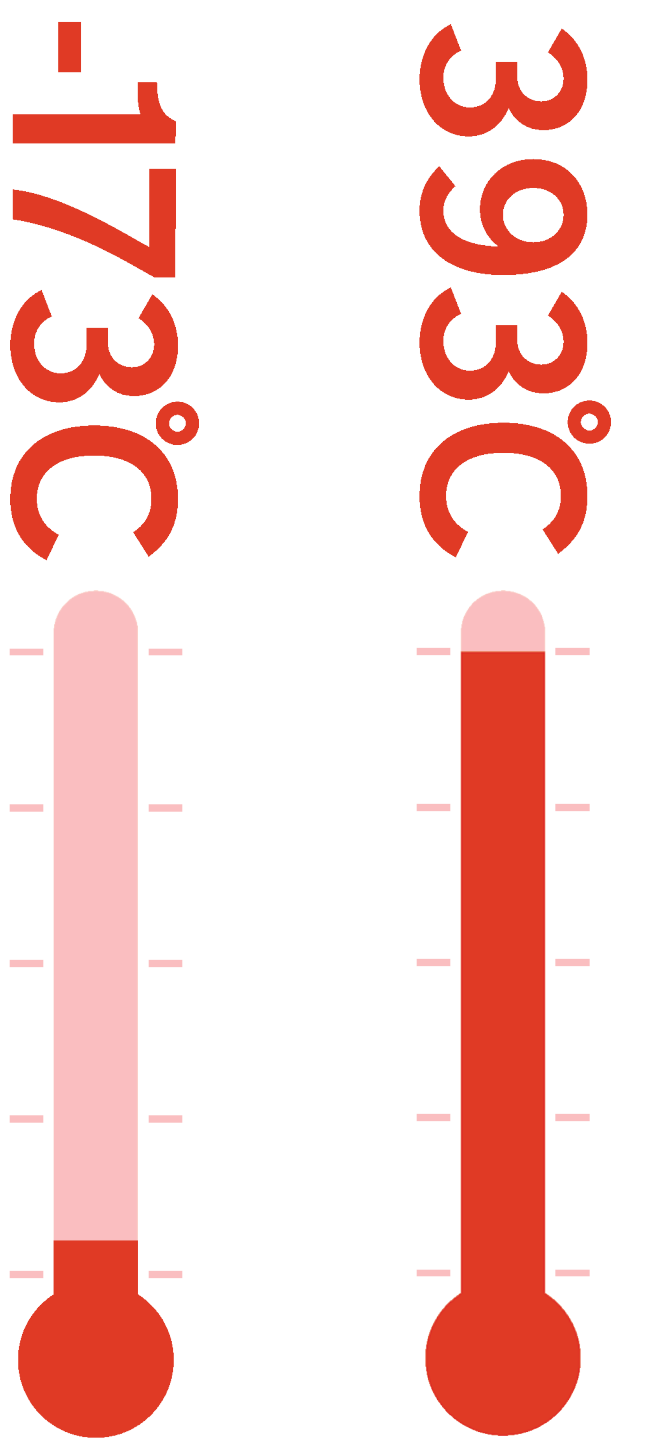
PHASE 2: ASSEMBLY

MOSS will dock with the ISS in order to facilitate its assembly by astronauts already in orbit. 100 days is sufficient time to account for delays, setbacks, and thorough testing of systems before the transfer to Mars.

ENVIRONMENT

SPACE IS A HARSH ENVIRONMENT

Induced by extreme temperature fluxuations, coupled with a negligible pressure coefficient. MOSS is designed to withstand this high stress environment with a >2.0 Factor of Safety.



HABITATION

COMMAND, CONTROL, DATA HANDLING

capabilities will be provided, along with energy storage and power distribution, thermal control, communications and tracking capabilities, environmental control and life support systems.

