

Webmaster Team #2192-1 Research Document

Helios name comes from the Greek God Helios. Helios, the sun god, traveled through the skies in a chariot. We felt this name was fitting for our company, which trains astronauts and gives them the opportunity to travel around the solar system.

1. About us:

- Helios is an international, English-speaking astronaut training program that includes vetting candidates, two-year long formal astronaut training, and a crewed mars mission in partnership with NASA and ESA.
- Helios will be based out of Huntsville Alabama, a hub for aerospace.
- Mission statement: Helios' mission is to make space training more accessible to an international audience thus uniting nations through space and to further scientific research in spaceflight.
- At Space Camp in Huntsville Alabama, where many youth and adults do mock astronaut training, Helios will construct their own building. Space Camp, which is internationally funded by space programs, already has many advanced features including a neutral buoyancy pool, three duplicate spacecraft for stimulations, and a newly built mars habitat stimulator. These will be shared by Space Camp and Helios for training purposes. In its own building, Helios will build a g-force accelerator, physical and mental testing rooms, and offices.

2. Basic information:

- In an effort to make astronaut training and space more accessible, Helios accepts astronaut applications from any UN recognized country or territory providing that the applicant is fluent in English. In the second round of testing all applicants must take an in-person, proctored ACTFL English fluency exam. Helios also does not consider gender or height.
- Astronaut applications with the following strengthen the application and improve the acceptance chance.
 - A doctorate degree from an accredited university or equivalent experience in natural sciences, medicine, or engineering.
 - Does not include psychology, nursing, social sciences, technology, or aviation technology. For further information about qualifying degrees contact us in the contact information page.
 - Teaching k-12 is considered equivalent for an astronaut candidate and educators are encouraged to apply.
- The classic Helios space flight is the moon exploration mission in which astronauts

3. Training:

- Astronauts must take classes in shuttle systems, basic science, technology, and mathematics.

- Astronauts trainees must also specialize in at least one field to compliment other astronaut's strengths in our group missions. Priority in a concentration is given to trainees with a bachelors and/or masters in a related field. Options for specializations include
 - Orbital dynamics
 - Astrology and astrophysics
 - Meteorology and geology
 - Medical and health sciences

3. Launch:

- The Mars Exploration mission will launch using a balloon hybrid with the rocket powered by a VASIMR engine, a Variable Specific Impulse Magnetoplasma Rocket.
- The rocket will launch from Kennedy Space Center, the hub for NASA rocket launches.

3. Recovery:

- The rocket's crew capsule will separate from the rest of the rocket during reentry.
- The rest of the rocket will return to Kennedy Space Center and redock itself on a platform for reusability.
- The crew capsule will land in a predetermined location near Newfoundland in the Atlantic Ocean. The specific landing sight will be determined two weeks before landing recovery based on the position of the spacecraft, weather conditions at splashdown sight, and availability of nearby rescue teams.
- A prepositioned crew will be at the projected launch sight trained in normal and emergency splash down scenarios.
- The mission team will establish a safety zone around the landing sight to protect the boating public and aircraft.
- Immediately after splashdown, two fast boats with personnel deploy from the main recovery ship. One of these boats checks for capsule integrity and tests the area around the ship for dangerous vapors. Then this boat prepares the spaceship for the main recovery ship. The second fast boat is responsible for recovering the capsule's parachutes which were earlier deployed from the capsule.
- Once the main recovery vessel is in position, it hoists the capsule on deck for the hatch to be opened. Medical professionals will be present to assist the crew if needed.

4. Promotion:

- The Helios mission will be promoted by both NASA and ESA on their websites and social media to spread awareness.
- There will be a joint program between Space Camp and Helios so that after completing training at space camp, adults will be advertised to about further astronaut training they can do at Helios.

Cost:

- The cost of Helios is heavily subsidized by the United States Government, NASA, ESA, and private donors. Our costs are designed to be as affordable as feasible, part of our goal to make space more accessible to the public.
- In US Dollars
 - Six month astronaut training bootcamp - 12,000
 - Full astronaut training course - 19,000
 - Training in speciality - 4,500 per specialty (includes classes and stimulation training)
 - Single fare trip to Mars - 54,000 *
 - Round trip to Mars - 98,000 *
 - Package delivery to mars - 1,200 per kilogram. Additional fee if the package is larger than 18" cubed. **

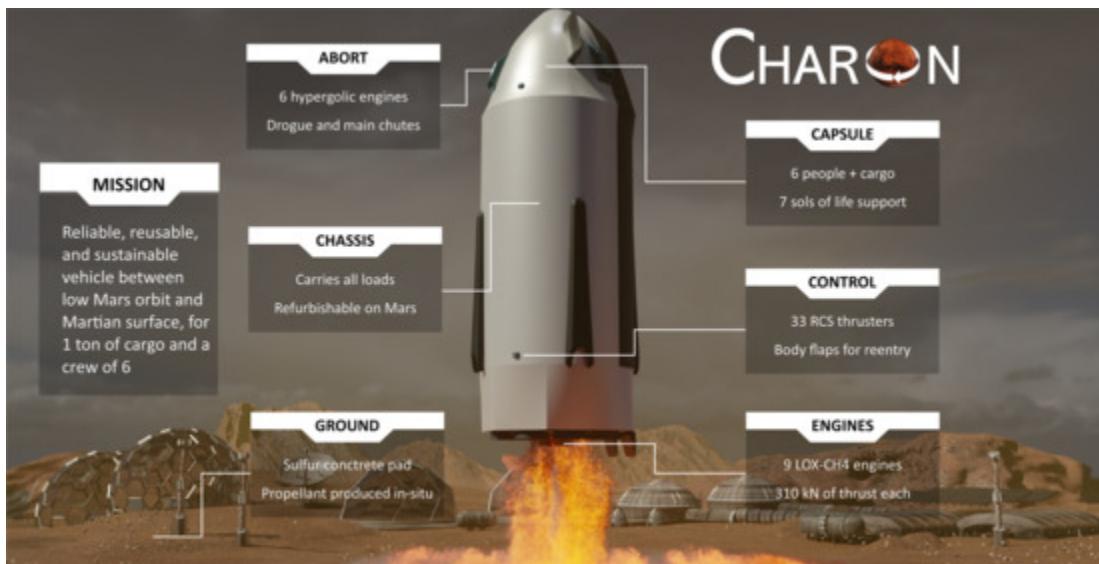
* Helios plans to reduce fare by up to 40% by 2030.

** Packages can not contain any live plants, animals, or viruses. Packages can not contain any liquids. Packages must be able to withstand temperatures from -30 to 220 degrees Celsius. Helios is not responsible for any damage to packages in transportation.

5. Vehicles:

- Earth to mars orbit: OTV (Orbit Transition Vehicle)
 - The Mars Exploration mission will use a balloon hybrid with the rocket powered by a VASIMR engine, a Variable Specific Impulse Magnetoplasma Rocket.
 - A typical rocket engine uses inertia to travel with roughly constant velocity. For example, Orion will take at least six months to get to Mars in the ideal orbit positions.
 - On the other hand, a neutral propellant is heated with radio waves to form a plasma which is then accelerated with magnetic fields to create thrust. A VASIMR engine constantly accelerates in space and can reach Mars in 31 days, six to ten times faster than a traditional combustion rocket.
 - However, since VASIMR engines slowly accelerate to reach great speeds, on their own, they do not create enough thrust to exit Earth's gravity. Therefore, a rocket-balloon hybrid will be used. The balloon will be made from a lightweight material a mile long and will be inflated with low density gas. The balloon will carry the rocket with the VASIMR engine to sub-orbital level where the rocket will detach from the balloon and use its engine to break out of the far weaker Earth gravity.
 - There will not be a similar gravity issue on Mars where the gravity is one-third as strong.

- Using a rocket-balloon hybrid is far less expensive since rockets usually expel most of their fuel at great cost to reach sub-orbital level. The saved cost will go towards making the astronaut training program less expensive and thus more accessible.
- Mars orbit to surface vehicle (Charon):
 - Once in Mars Orbit, the crew will use the reusable Charon shuttle to be ferried from orbit to surface while the rocket remains in orbit.
 - Pre-build infrastructure on mars will harvest solar and atomic energy to recharge the Charon shuttle.
 - After the mission, the charged Charon shuttle will return the crew to the VASIMR rocket.



6. Astronaut Application:

- https://docs.google.com/forms/d/1PTKqZ88I9wLJWSREmPhgtR6cYbMRuAL25VHoi_0uwzA/edit
- Mental exam includes an MSE, mental status exam, MBTI, Myer-Briggs personality exam, and personal interviews.
- Physical exam includes that distal and near eyesight must be correctable to 20/20 in each eye, blood pressure must not exceed 140/90 when sitting, and a medical screening.

7. Attractions:

- Life Science Detective Tour
 - Visit Gale Crater and Mount Sharp. A decade ago, Curiosity found streambeds, complex organic molecules, changes of methane concentrations and other startling signs of life in this crater. Continue to search for signs of life in person at Gale Crater. This excursion is related to geology, biology, and biochemistry. Look

for signs of life in rocks 3.5 billion years old and enjoy the take a hike up the nearby Mount Sharp volcano. How would it feel to be the one to discover alien life! Find out on the Life Science Detective Tour.

- Orbit Sightseeing tour:
 - Some Martian locations are too awe-inspiring to capture from the ground, so instead we offer the Orbit tour aboard our OTV (Orbit Transition Vehicle). Some stops along the tour include:
 - Gale Crater
 - -5.4° , 137.8°
 - Mount sharp
 - -5.08° , 137.85°
 - Valles Marineris Canyon: ([13.9°S 59.2°W](#)) aka $(-13.9^\circ, -59.2^\circ)$
 - Valles Marineris is the largest canyon in the solar system, long enough to stretch from Los Angeles to New York City! See this one-of-kind canyon in our solar system, all 1,850 miles of it.



Image address:

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- Medusae Fossae: ([3.2°S 163.0°W](#)) aka $(-3.2^\circ, -163^\circ)$
 - Medusae Fossae is a huge volcanic deposit, a fifth of the size of the United States! Some claim its origin came from hundreds of volcanic eruptions over 500 million years while others claim its origin is from a UFO crash. Either way, see this unforgettable marvel!



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- Olympus Mons: (18.65°, 226.2°)
 - Mars also has the tallest volcano in the solar system. Olympus Mons is the size of Arizona and three times taller than Mount Everest. Olympus Mons is even greater than its namesake, the legendary Grecian Mount Olympus!

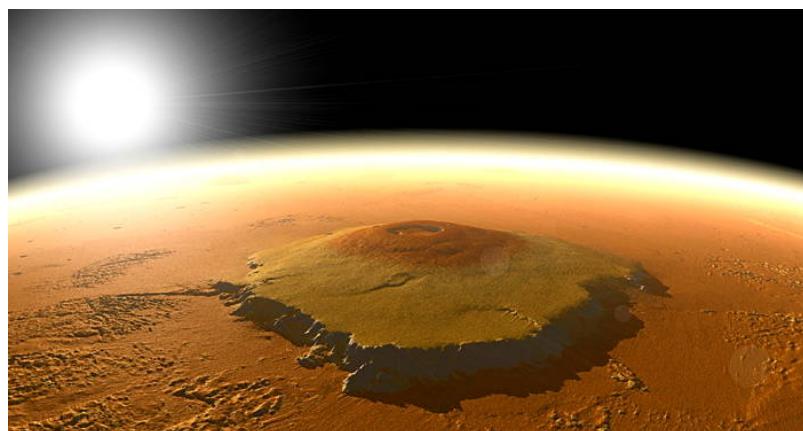


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<https://allthatsinteresting.com/wordpress/wp-content/uploads/2018/06/olympus-mons-illustration.jpg>

- All Mars ATV Trip:
 - Transverse all of Mars in Helio's rovers. Inspired by NASA's 2017 Mars Rover Concept Vehicle, the Helios Rover is powered completely by solar energy, travels up to 70 miles per hour or 10-15 kilometers per hour, weighs 5,000 pounds, is 28 feet long, and even includes a mobile laboratory. Take the most unconventional road trip and buckle up!



Image address:

https://cdn.shopify.com/s/files/1/1679/6063/articles/nasa-mars-rover-concept_1600x750.jpg?v=1496945826

- Go beyond Mars!
 - In addition to Mars, Helios also offers full size simulations and virtual reality tours of all other solar system planets. A thrilling experience, all in safety!
 - <https://youtu.be/hEdzv7D4CbQ>
 - And here is one of our space simulation facilities at the Mauna Loa Volcano in Hawaii.



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Former NASA HI-SEAS members

Earth Moon:

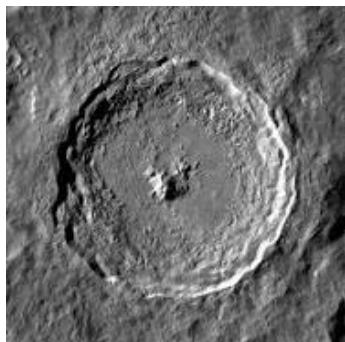
- Visit Tranquility Base - The landing sight of the Apollo 11 mission. See the first human footsteps on the moon.
 - Coordinates: lunar coordinates are $00^{\circ}41'15''\text{N}$, $23^{\circ}26'00''\text{E}$



- Montes Appenius: The tallest mountain range on the moon and the landing sight of the Apollo 15 mission.
 - Coordinates: $18.9^{\circ}\text{N}/3.7^{\circ}\text{W}$



- Tycho Crater: Located in the southern lunar highlands this crater is highly reflective meaning that one can see bright streaks in the crater. This crater is also one of the youngest in the universe at 108 billion years old.
 - Coordinates: $43.37^{\circ}\text{S}, 348.68^{\circ}\text{E}$



- Copernicus Crater: Named after the esteemed astrologist Nicolas Copernicus, this crater is the brightest spot on the moon, and is easily recognizable as the only bright spot in the dark maria.
 - Coordinates: $10^{\circ}\text{N}, 20^{\circ}\text{W}$

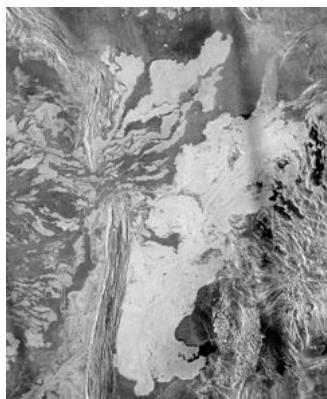


- Oceanus Procellarum: The largest lunar maria and the only lunar maria to also be designated as an ocean. This ocean is 4 million km² and is the landing sight of the Apollo 12 mission.
 - Coordinates: 18.4°N 57.4°W

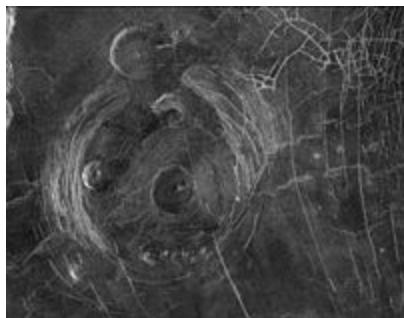


Venus:

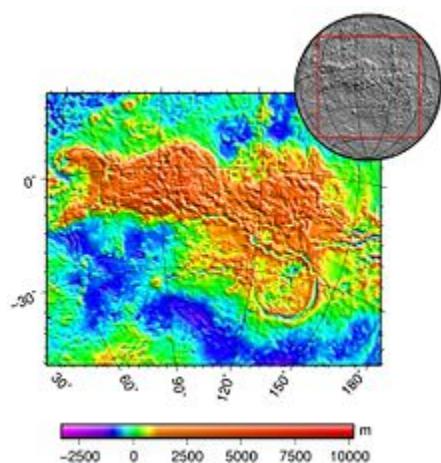
- Visit the Alien Rift Zones. These rift zones are made up of parallel ridges and valleys hundreds of kilometers long.
 - Coordinates: 10 N 190 E



- Coordinates: No coordinates available choose a random spot
- The Floor is Lava - Venus is famous for its coronoae, circular patterns formed by Venus' core releasing heat. These coronae are often accompanied by vast lava lakes.
 - Coordinates: 0 N 250 E



- Maxwell Montes - An alien looking mountain, the elevation is so high that the mountain floor is made up of metal. The metal reflects sunlight, making Maxwell Montes the brightest spot on Venus.
 - Coordinates: 65 N 6 E



- Venera 3 - Visit the landing site of Venera 3, the first probe to land on Venus and the first successful impact mission by the Soviet Union. After 8 landing failures, the Venera 3 success was an important milestone in space exploration. Follow in the path of Venera 3 and be inspired by the astronomical success story.
 - Coordinates: 5 S 351 E



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Jupiter:

- More Than Just a Spot - The Great Red Spot is larger than the entire Planet Earth. Scientists first discovered the great storm over 200 years ago, and many people have wondered and speculated about this incredible storm since. Get the opportunity to see this storm first hand.
 - Coordinates: 22 S
- Jupiter Artist Retreat - Due to Jupiter's intense atmospheric pressure, there have been no landings on Jupiter yet, but there have been many flyby vehicles and orbiters. The Jupiter magnetic fields create dozens of spinning cloud layers. View these mesmerizing skies from orbit from the Helios Artist Retreat and feel inspired to create your own art.
 - Coordinates: 5 N 18 E

Mercury:

- Caloris Basin - The Caloris Basin is a mammoth basin, the largest on Mercury and one of the largest in the solar system. On this trip, visit the Caloris Basin to learn about the impact and tumult in the formation of the solar system and study the Mercury rock composition for signs of previous lava oceans.
 - Coordinates: 30 N 190 W



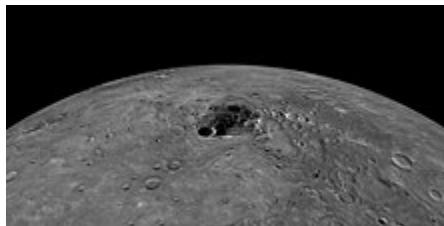
- Mysteries of the Ghost Craters - Search for mysteries of the past at Mercury's ghost craters. On the cosmic time scale, very recently these craters were filled with lava and are now obscured or completely hidden.
 - Coordinates: 60 N 37 E



- Adventure at the Poles - Recent data has supported that ice likely exists at Mercury's poles. The poles' low temperatures and shallow basins make them ideal locations for ice

to accumulate, and the poles are also more reflective, suggesting the existence of ice.
Find the first signs of water and ice beyond the Earth and the Mercury Poles.

- Coordinates: I can't find any online but any location is good probably



- The Ancient Wheel - Mercury's Rembrandt Basin has long puzzled astronomers. The basin perfectly illustrates a wheel with spokes spinning around an axle. The shape of this basin is unlike any other found in the solar system. Though the wheel and axle may have been invented on Earth thousands of years ago, the wheel and axle were already present on Mercury.
 - Coordinates: 32 S 272 W



NASA stimulation: <https://solarsystem.nasa.gov/moons/earths-moon/overview/>

- Images

- Mars images
 - <https://images.nasa.gov/details-PIA04591>
 - <https://www.nasa.gov/multimedia/guidelines/index.html>
- <https://www.svgrepo.com/svg/296532/spacecraft-spaceship>
- https://en.wikipedia.org/wiki/File:NASA_logo.svg
 - https://en.wikipedia.org/wiki/File:European_Space_Agency_logo.svg
- https://en.wikipedia.org/wiki/File:USSRC_Rocket_Park.JPG
 - [https://en.wikipedia.org/wiki/File:ISS-48_Towering_cumulonimbus_and_other_clouds_over_the_Earth_\(2\).jpg](https://en.wikipedia.org/wiki/File:ISS-48_Towering_cumulonimbus_and_other_clouds_over_the_Earth_(2).jpg)
- https://en.wikipedia.org/wiki/File:Atlantic_Ocean_to_Africa.ogv
 - <https://eol.jsc.nasa.gov/Videos/CrewEarthObservationsVideos/NorthAmerica.htm>

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- https://en.wikipedia.org/wiki/File:Orion_Artemis_I_Selfie_1.jpg
- https://en.wikipedia.org/wiki/File:Soyuz_TMA-9_launch.jpg
- UV maps
 - <https://planet-texture-maps.fandom.com/wiki/Mars>
 - <https://planet-texture-maps.fandom.com/wiki/Moon>
 - <https://planet-texture-maps.fandom.com/wiki/Venus>
 - <https://planet-texture-maps.fandom.com/wiki/Mercury>
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