# Galaxy Voyage to grade to Galaxy Voyage to grade to Galaxy Voyage to grade to grade





### Overview of the Voyage Nothing Else Like It!

The Galaxy Voyage to Alpha Centauri is the most amazing journey you will ever take. Forget about European vacations, the stars is the most excitement you will ever experience in your lifetime. Journey thru the stars in our state of the art luxury star ship with ample viewing observation decks and activities to keep you occupied while in standard flight.

After briefly visiting the planets in our own Solar System, we will enter stasis and sleep thru the four light year journey to the Alpha Centauri Solar System. Alpha Centauri is a trinary star system, each with its own planet. There we will briefly visit the first two planets before staying at the resort on the third.

After the best four weeks of your life on Centauri Prime, the journey continues to the nearby Gas Giant System, just show short stasis sleep away. We will visit and orbit each of the 15 gas giant planets before returning to stasis and journeying back home to Earth.

After a brief quarantine, you will return to your lives forever changed by this astonishing experience!

Photo Page 2 Milky Way Galaxy from Lake Takapeo, New Zealand by Graham Hotshausen



Photo Page 3 Earth Gulf of Mexico, United States by NASA



### Our Very Own Solar System The Journey Begins Mercury

Planetary Science missions, past, current, in planning or in development, extend mankind's presence to the solar system's inner rocky worlds, helping to unlock the secrets of the solar systems' composition, history and evolution, and how life established itself on Earth.

NASA's Planetary Science missions to the outer planets help reveal secrets about the solar system by observing those outer distant worlds up close. Jupiter's moon Europa and Saturn's moon Enceladus are now thought to hide liquid water beneath their frozen surfaces and are high priority targets for NASA. Unlocking their secrets and those of the outer planets will help scientists understand more about planet Earth and the formation and evolution of the solar system.

The information collected by NASA over the centuries has helped the human race to better understand our place in the universe. Despite the cold hard reality of space, we are able to explore, and journey to numerous locations thanks in part to NASA, USGS, and other exploration and technology organizations.

Photo Page 4 from Weightless Observation Room

The smallest planet in our solar system and nearest to the Sun, Mercury is only slightly larger than Earth's Moon. From the surface of Mercury, the Sun would appear more than three times as large as it does when viewed from Earth, and the sunlight would be as much as seven times brighter. Despite its proximity to the Sun, Mercury is not the hottest planet in our solar system – that title belongs to nearby Venus, thanks to its dense atmosphere. But Mercury is the fastest planet, zipping around the Sun every 88 Earth days.

Mercury is the second densest planet, after Earth. It has a large metallic core with a radius of about 1,289 miles (2,074 kilometers), about 85 percent of the planet's radius. There is evidence that it is partly molten, or liquid. Mercury's outer shell, comparable to Earth's outer shell (called the mantle and crust), is only about 400 kilometers (250 miles) thick.



### Venus

Venus is the second planet from the Sun and our closest planetary neighbor. Similar in structure and size to Earth, Venus spins slowly in the opposite direction from most planets. Its thick atmosphere traps heat in a runaway greenhouse effect, making it the hottest planet in our solar system with surface temperatures hot enough to melt lead. Glimpses below the clouds reveal volcanoes and deformed mountains.

The brightest object in the night sky on Earth (besides our moon), Venus has been observed for millennia. And as one of just two bodies between Earth and the Sun, Venus periodically passes across the face of the sun-a phenomenon called a transit. Observing transits of Venus has helped astronomers study the nearby planet and better understand the solar system and our place in it. Such long gaps occur between transits because Earth's and Venus' orbits around the sun are inclined differently, so Venus much more often passes between Earth and the sun without crossing the face of the sun from our perspective.

#### Photo Page 5 Mercury by USGS



## Take a Space Walk on Mars

Mars was named by the ancient Romans for their god of war because its reddish color was reminiscent of blood. Other civilizations also named the planet for this attribute; for example, the Egyptians called it "Her Desher," meaning "the red one." Even today, it is frequently called the "Red Planet" because iron minerals in the Martian dirt oxidize, or rust, causing the surface to look red. After a few days of the breathtaking views, you won't want to leave!

#### Size and Distance

With a radius of 2,106 miles (3,390 kilometers), Mars is about half the size of Earth. If Earth were the size of a nickel, Mars would be about as big as a raspberry.

From an average distance of 142 million miles (228 million kilometers), Mars is 1.5 astronomical units away from the Sun. One astronomical unit (abbreviated as AU), is the distance from the Sun to Earth. From this distance, it takes sunlight 13 minutes to travel from the Sun to Mars.

#### Orbit and Rotation

As Mars orbits the Sun, it completes one rotation every 24.6 hours, which is very similar to one day on Earth (23.9 hours). Martian days are called sols—short for "solar day." A year on Mars lasts 669.6 sols, which is the same as 687 Earth days.

Mars' axis of rotation is tilted 25 degrees with respect to the plane of its orbit around the Sun. This is another similarity with Earth, which has an axial tilt of 23.4 degrees. Like Earth, Mars has distinct seasons, but they last longer than seasons here on Earth since Mars takes longer to orbit the Sun (because it's farther away). And while here on Earth the seasons are evenly spread over the year, lasting 3 months (or one quarter of a year), on Mars the seasons vary in length because of Mars' elliptical, egg-shaped orbit around the Sun.

### Take a Space Walk along the Glorious Cliffsides.

### Both NASA and ESA have plans to build new stations on Mars in 3056.

Spring in the northern hemisphere (autumn in the southern) is the longest season at 194 sols. Autumn in the northern hemisphere (spring in the southern) is the shortest at 142 days. Northern winter/southern summer is 154 sols, and northern summer/southern winter is 178 sols.

#### Structure

Mars has a dense core at its center between 930 and 1,300 miles (1,500 to 2,100 kilometers) in radius. It's made of iron, nickel and sulfur. Surrounding the core is a rocky mantle between 770 and 1,170 miles (1,240 to 1,880 kilometers) thick, and above that, a crust made of iron, magnesium, aluminum, calcium and potassium. This crust is between 6 and 30 miles (10 to 50 kilometers) deep.

Photo Page 6 Cliffside on Mars by Nicolas Labos TION



### **Glorious** Sites

#### Formation

When the solar system settled into its current layout about 4.5 billion years ago, Mars formed when gravity pulled swirling gas and dust in to become the fourth planet from the Sun. Mars is about half the size of Earth, and like its fellow terrestrial planets, it has a central core, a rocky mantle and a solid crust.

#### Surface

The Red Planet is actually many colors. At the surface we see colors such as brown, gold and tan. The reason Mars looks reddish is due to oxidization—or rusting—of iron in the rocks, regolith, and dust of Mars. This dust gets kicked up into the atmosphere and from a distance makes the planet appear mostly red.

Mars' surface has nearly the same area as Earth's dry land. Its volcanoes, impact craters, crustal movement, and atmospheric conditions such as dust storms have altered the landscape of Mars over many years, creating some of the solar system's most interesting topographical features.

Photo Page 8

Cliffside on Mars

A large canyon system called Valles Marineris is long enough to stretch from California to New York—more than 3,000 miles (4,800 kilometers). This Martian canyon is 200 miles (320 kilometers) at its widest and 4.3 miles (7 kilometers) at its deepest. That's about 10 times the size of Earth's Grand Canyon.

Mars is home to the largest volcano in the solar system, Olympus Mons. It's three times taller than Earth's Mt. Everest with a base the size of the state of New Mexico.

Mars appears to have had a watery past, with ancient river valley networks, deltas and lakebeds, as well as rocks and minerals on the surface that could only have formed in liquid water. Some features suggest that Mars experienced huge floods about 3.5 billion years ago.

There is water on Mars today, but the Martian atmosphere is too thin for liquid water to exist for long on the surface. Today, water on Mars is found in the form of water-ice just under the surface in the polar regions as well as in briny (salty) water, which seasonally flows down some hillsides and crater walls.

> Photo Page 9 Valley on Mars by Dex Ezekiel



### The Outer Planets Uranus

Saturn is the sixth planet from the Sun and the second largest planet in our solar system. Adorned with a dazzling system of icy rings, Saturn is unique among the planets. It is not the only planet to have rings, but none are as spectacular or as complex as Saturn's. Like fellow gas giant Jupiter, Saturn is a massive ball made mostly of hydrogen and helium.

Saturn

Surrounded by more than 60 known moons, Saturn is home to some of the most fascinating landscapes in our solar system. From the jets of water that spray from Enceladus to the methane lakes on smoggy Titan, the Saturn system is a rich source of scientific discovery and still holds many mysteries.

The farthest planet from Earth discovered by the unaided human eye, Saturn has been known since ancient times. The planet is named for the Roman god of agriculture and wealth, who was also the father of Jupiter.

> Photo Page 11 Low Orbit of Neptune by USGS

Photo Page 10 Low Orbit of Saturn by NASA The seventh planet from the Sun with the third largest diameter in our solar system, Uranus is very cold and windy. The ice giant is surrounded by 13 faint rings and 27 small moons as it rotates at a nearly 90-degree angle from the plane of its orbit. This unique tilt makes Uranus appear to spin on its side, orbiting the Sun like a rolling ball.

The first planet found with the aid of a telescope, Uranus was discovered in 1781 by astronomer William Herschel, although he originally thought it was either a comet or a star. It was two years later that the object was universally accepted as a new planet, in part because of observations by astronomer Johann Elert Bode.

William Herschel tried unsuccessfully to name his discovery Georgium Sidus after King George III. Instead the planet was named for Uranus, the Greek god of the sky, as suggested by Johann Bode.

### Neptune

Dark, cold and whipped by supersonic winds, ice giant Neptune is the eighth and most distant planet in our solar system. More than 30 times as far from the Sun as Earth, Neptune is the only planet in our solar system not visible to the naked eye. In 2011 Neptune completed its first 165year orbit since its discovery in 1846.

Neptune is so far from the Sun that high noon on the big blue planet would seem like dim twilight to us. The warm light we see here on our home planet is roughly 900 times as bright as sunlight on Neptune.

The ice giant Neptune was the first planet located through mathematical calculations. Using predictions made by Urbain Le Verrier, Johann Galle discovered the planet in 1846. The planet is named after the Roman god of the sea, as suggested by Le Verrier.





## Jupiter is More Than Just the Red Spot

Jupiter is the fifth planet from our Sun and is the largest planet in the solar system – more than twice as massive as all the other planets combined. Jupiter's stripes and swirls are actually cold, windy clouds of ammonia and water, floating in an atmosphere of hydrogen and helium. Jupiter's iconic Great Red Spot is a giant storm bigger than Earth that has raged for hundreds of years.

Jupiter is surrounded by dozens of moons. Jupiter also has several rings, but unlike the famous rings of Saturn, Jupiter's rings are very faint and made of dust, not ice.

#### Size and Distance

With a radius of 43,440.7 miles Jupiter is 11 times wider than Earth. If Earth were the size of a nickel, Jupiter would be about as big as a basketball.

From an average distance of 484 million miles Jupiter is 5.2 astronomical units away from the Sun. One astronomical unit (AU), is the distance from the Sun to Earth. From this distance, it takes Sunlight 43 minutes to travel from the Sun to Jupiter.

Photo Page 12 Low Orbit of Jupiter by Elsida Rixhipi

#### Orbit and Rotation

Jupiter has the shortest day in the solar system. One day on Jupiter takes only about 10 hours (the time it takes for Jupiter to rotate or spin around once), and Jupiter makes a complete orbit around the Sun (a year in Jovian time) in about 12 Earth years (4,333 Earth days).

Its equator is tilted with respect to its orbital path around the Sun by just 3 degrees. This means Jupiter spins nearly upright and does not have seasons as extreme as other planets do.

#### Structure

The composition of Jupiter is similar to that of the Sun—mostly hydrogen and helium. Deep in the atmosphere, pressure and temperature increase, compressing the hydrogen gas into a liquid. This gives Jupiter the largest ocean in the solar system—an ocean made of hydrogen instead of water. Scientists think that, at depths perhaps halfway to the planet's center, the pressure becomes so great that electrons are squeezed off the hydrogen atoms, making the

> Photo Page 13 Low Orbit of Jupiter by USGS

liquid electrically conducting like metal. Jupiter's fast rotation is thought to drive electrical currents in this region, generating the planet's powerful magnetic field. It is still unclear if, deeper down, Jupiter has a central core of solid material or if it may be a thick, super-hot and dense soup. It could be up to 90,032 degrees Fahrenheit (50,000 degrees Celsius) down there, made mostly of iron and silicate mineral.





### Arriving at Alpha Centauri

The stars in the Alpha Centauri system include a pair called "A" and "B," (AB for short) which orbit relatively close to each other. Alpha Cen A is a near twin of our Sun in almost every way, including age, while Alpha Cen B is somewhat smaller and dimmer but still quite similar to the Sun. The third member, Alpha Cen C (also known as Proxima), is a much smaller red dwarf star that travels around the AB pair in a much larger orbit that takes it more than 10 thousand times farther from the AB pair than the Earth-Sun distance. Proxima currently holds the title of the nearest star to Earth, although AB is a very close second.

The Chandra data reveal that the prospects for life in terms of current X-ray bombardment are actually better around Alpha Cen A than for the Sun, and Alpha Cen B fares only slightly worse. Proxima, on the other hand, is a type of active red dwarf star known to frequently send out dangerous flares of X-ray radiation, and is likely hostile to life.

Long-term measurements have captured the complete ups and downs of the X-ray activity of AB, analogous to the Sun's 11-year sunspot cycle. They show that any planets in the habitable zone for A would receive a lower dose of X-rays, on average, than similar planets around the Sun. For companion B the X-ray dose for habitable zone planets is higher than for the Sun, but only by a factor of about five.

In comparison planets in the habitable zone around Proxima receive an average dose of X-rays about 500 times larger than the Earth, and 50,000 times larger during a big flare.

Besides illuminating the possible habitability of Alpha Cen's planets, Chandra's X-ray history of AB plays into theoretical explorations of our own Sun's cyclical X-ray activity. Understanding this is a key to cosmic hazards such as Space Weather, which can impact the technologyladen civilization right here on our home world.

Tom Ayres presented these results at the 232rd meeting of the American Astronomical Society meeting in Denver, Colorado, and some of these results were published in January 2018 in the Research Notes of the American Astronomical Society. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

A new study that has involved monitoring of Alpha Centauri for more than a decade by NASA's Chandra X-ray Observatory provides encouraging news about one key aspect of planetary habitability. It indicates that any planets orbiting the two brightest stars in the Alpha Cen system are likely not being pummeled by large amounts of X-ray radiation from their host stars. X-rays and related Space Weather effects are bad for unprotected life, directly through high radiation doses and indirectly through stripping away planetary atmospheres (a fate thought to have been suffered by Mars in our own Solar System). Alpha Centauri is a triple star system located just over four light years, or about 25 trillion miles, from Earth. While this is a large distance in terrestrial terms, it is much closer than the next nearest Sun-like stars.

Photo Page 14 Alpha Centauri Solar System by Gemma Evans



### Invicta

When these planets were first discovered over 1,000 years ago, Invicta was the most habitable. Earth began to colonize the planet and multiple settlements were established. Approximately 500 years ago, a devastating solar flare from Alpha Cen A emitted so much radiation that it forced the settlers to evacuate immediately. Those that survived, resettled on Centauri Prime.

The irony of naming the planet Invicta became all so true after the solar flare. Invicta is a Latin word meaning unconquered, fitting seeing it was the first planet outside of our own solar system to be colonized. However, the word Invicta can also mean unconquerable...

Due to the immense radiation, we cannot land and explore Invicta any longer. We can however, take shuttles to the service to view the ruins that once stood proud.

Photo Page 17 Settler Ruins Personal Dwelling on Invicta by John Fowler

Photo Page 16 Settler Ruins Worship Center on Invicta by Natalya Letunova





### Proxima

Proxima B is a rocky world that is survivable, but not necessarily habitable. We will spend a few days here and nights on back on the ship. We will shuttle down in small groups and explore the landscape. Wear comfortable shoes, there will a lot of walking once we are out of the shuttles.

Breathing is difficult without the use of oxygen masks. Luckily, the atmosphere doesn't affect our eyesight, therefore, you will be able to witness the splendor with your own eyes, and not thru a screen.

It is a lot like Mars in that it seems to have had life millions of years ago, but it now just dry rocky cliff sides and mountains. Regardless, it is a beauty to be sure, especially at night seeing the view of the center of the Milky Way Galaxy.

> Photo Page 19 Cliffhills of Proxima B by John Fowler

Photo Page 18 Cliffhills of Proxima B by John Fowler





### Centauri Prime

Centauri Prime, is now home to millions of off-worlders, including the decedents from the refugees of Invicta. Prior to the solar flare, Centauri Prime was not being considered for settlement due to its copious dry land masses and lack of oceans. After the solar flare, more exploration occurred and found that bodies of water existed under the surface of the planet. While the surface may look like a dry desert world, it is teaming with the necessities to sustain life... Water. While no life other than our own has been discovered on Centauri Prime, we continue to search. In addition to the resort, research stations have been established all over the planet. The majority of the surface of Centauri Prime is very similar to the Trona Pinnacles of California, Earth. The rock and sand have a pinkish hue. Very beautiful against the blue skies. The Rainbow Desert Valley is another breathtaking location, about an two hour shuttle ride from the resort. Unlike the deserts of Earth, Centauri Prime has a moderate temperature all year round everywhere on the planet and make the perfect vacation location.

> Photo Page 21 Below Cliffhiss of Centauri Prime at Night by Will Truettner



Photo Page 20 Cliffside of Centauri Prime by Will Truettner Photo Page 21 Righ Space Station Corridor on Centauri Prime by Manuel Polo



### Centauri Prime

Centauri Prime hosts the best resort in the galaxy! Our state of the art resort has everything you need for your extended stay on Centauri Prime. Whether you are out for adventure, relaxation, or both, we will take care of everything to you need to have the best experience of your entire life!

If you feel thought the rooms on the ship were nice, wait until you see the suite which you will be staying in. Separate bedrooms, living space, kitchenette, and dining area. It's like a little apartment just for you!

Spend your days relaxing in our state of art day spa. Take a mud bath after a relaxing massage. Enjoy time in our hot tub after a long day of hiking. Spoil yourself!

If you begin to get a little homesick for plant life, visit the spacious arboretum. As you walk thru the tunnel of trees, you will be amazed at how much earth plant life is flourishing on Centauri Prime.

Enjoy a fantasy adventure in one of our many virtual reality suites. Feel what it might be like to walk among the great kings and queens from days of old. Visit space ship and space stations from ancient television shows such as Star Trek or Battlestar Galactica. The way our ancestors viewed what future space travel might be like is a gas!

If you prefer the real thing, take a hike over the glorious pink mountains or rainbow hills. Then spend a few nights enjoying star gazing while luxury camping with your own cabin. The nights are a little cooler, so bring a sweater...

Before you leave Centauri Prime, shop at one of dozens of gift shops along the promenade. Forgot your bathing suit? No problem, we have just about every item you could possibly need at are resort commissary. Our promenade also features numerous restaurants of a wide variety to fulfill any craving. All food is included in your package.

The final leg of our journey will be to the nearby Gas Giant Solar System. We can only orbit the planets, which we will do for long enough for everybody to get a spectacular view. The storms and gas create such magnificent colors and patterns that you will be astonished that they are not paintings!

Photo Page 22 Cliffside of Centauri Prime by Will Truettner Photo Page 23 Space Station Corridor on Centauri Prime by Manuel Polo



## Final Leg of the JourneyVS-229CF-321SK-496



Photo Page 25 Lef VS-229 by USGS

Photo Page 24 Gas Giant Solar System by Daniel Olah





Photo Page 25 Center CF-321 by USGS Photo Page 25 Right SK-496 by USGS



### Gorgeous Gas Giants LF-364 WD-250 GH-781



Photo Page 27 Lef LF-364 by USGS

Photo Page 26 Low Orbit of Planet LF-364 by NASA Photo Page 27 Middle WD-250 by USGS **27** 

Photo Page 27 Right GH-781 by USGS



### Gorgeous Gas Giants BS-131 DL-412 DW-423



BS-131 by USGS

Photo Page 28 Low Orbit of Planet BS-131 by NASA Photo Page 29 Middle DL-412 by USGS

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Photo Page 35 Right WD-423 by USGS



## Gorgeous Gas GiantsVS-793GB-262WW-257



Photo Page 31 Lef VS-793 by USGS

Photo Page 30 Low Orbit of Planet VS-793 by NASA Photo Page 31 Middle GB-262 by USGS Photo Page 31 Right WW-257 by USGS







## Jewel of the Gas Giant SystemBT-044TB-095KK-256



Photo Page 35 Left BT-044 by USGS

Photo Page 34 Planet BT-044 from the Observatory by Pawel Czerwinski





Photo Page 35 Right KK-256 by USGS

Photo Pages 32-33, 35 Middle TB-095 by USGS



### Back to the Blue Marble

### Earth

Our home planet is the third planet from the Sun, and the only place we know of so far that's inhabited by living things. While Earth is only the fifth largest planet in the solar system, it is the only world in our solar system with liquid water on the surface. Just slightly larger than nearby Venus, Earth is the biggest of the four planets closest to the Sun, all of which are made of rock and metal.

The name Earth is at least 1,000 years old. All of the planets, except for Earth, were named after Greek and Roman gods and goddesses. However, the name Earth is a Germanic word, which simply means "the ground."

#### Size and Distance

With a radius of 3,959 miles (6,371 kilometers), Earth is the biggest of the terrestrial planets, and the fifth largest planet overall.

From an average distance of 93 million miles (150 million kilometers), Earth is exactly one astronomical unit away from the Sun because one astronomical unit (abbreviated as AU), is the distance from the Sun to Earth. This unit provides an easy way to quickly compare planets' distances from the Sun.

It takes about eight minutes for light from the Sun to reach our planet.

#### Structure

Earth is composed of four main layers, starting with an inner core at the planet's center, enveloped by the outer core, mantle and crust.

The inner core is a solid sphere made of iron and nickel metals about 759 miles (1,221 kilometers) in radius. There the temperature is as high as 9,800 degrees Fahrenheit (5,400 degrees Celsius). Surrounding the inner core is the outer core. This layer is about 1,400 miles (2,300 kilometers) thick, made of iron and nickel fluids.

In between the outer core and crust is the mantle, the thickest layer. This hot, viscous mixture of molten rock is about 1,800 miles (2,900 kilometers) thick and has the consistency of caramel. The outermost layer, Earth's crust, goes about 19 miles (30 kilometers) deep on average on land. At the bottom of the ocean, the crust is thinner and extends about 3 miles (5 kilometers) from the sea floor to the top of the mantle.

#### Atmosphere

Near the surface, Earth has an atmosphere that consists of 78 percent nitrogen, 21 percent oxygen, and 1 percent other gases such as argon, carbon dioxide and neon. The atmosphere affects Earth's long-term climate and short-term local weather and shields us from much of the harmful radiation coming from the Sun. It also protects us from meteoroids, most of which burn up in the atmosphere, seen as meteors in the night sky, before they can strike the surface as meteorites.

Photo Page 42 Earth by NASA



### Something for Everybody

The entire round trip takes just over ten years. We know this is quite a commitment, therefore we do offer smaller packages. Tour our Solar System in a few months. Visit Centauri Prime only in just under eight years. When time away from earth is not an issue, we have longer packages that extend the stay on each planet we visit on in an ultra-luxury star ship. Built almost like small cities, everything you could possibly need will be available while not in stasis. The longer voyage is best suited for the recently retired. After spending over a decade away from Earth, come home and meet your great grandchildren and be practically the same age as when you left!

Prices range from 1 million US dollars to 8 million US dollars. If our journey is out of your price range, fear not, we have most of the visuals available in virtual reality. Prices start at \$50,000.

There is no telling where humanity will go next...

Page 39 Milky Way Galaxy Rocky Mountain National Park, by Jeremy Thomas

Page 38 Nearby Nebula by NASA



### See What's Awaits Out There...















