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A CONFIDENTIAL  
REPORT ON THE  
BIOLOGICAL AND SOCIAL  
HISTORY OF PANDORA

JAMES CAMERON'S

# AVATAR

**AN ACTIVIST  
SURVIVAL GUIDE**

MARIA WILHELM & DIRK MATHISON

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MARIA WILHELM & DIRK MATHISON



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“THERE ARE MANY DANGERS ON PANDORA, AND ONE OF THE SUBTLEST IS THAT YOU MAY COME TO LOVE IT TOO MUCH.”

—DR. GRACE AUGUSTINE



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# NOIRRA

## A SURVIVAL HANDBOOK

### *FELLOW TERRANS*

The armies of greed lay waste to the Earth and all its creatures. In our hunger for energy—for more and more—we've devastated our planet. We're neck-deep in festering industrial muck, in a trash heap of ever-expanding waste and decay. Overpopulation, overdevelopment, nuclear terrorism, environmental warfare, radiation leakage from power plants and waste dumps, toxic runoff, air pollution, deforestation, global warming, ozone depletion, loss of biodiversity through extinction . . . our once blue-green and beautiful Earth is now a terminal cesspool—an oozing wound cut deep into the face of the universe. Dollar for dollar, we've bought our extinction.

So who am I? I'm a neighbor, a friend, the enemy. I am anonymous. I am invisible. I am everywhere. I shuffle past you in a dense crowd, shoulder to jammed shoulder, unwashed because of the water shortages, stinking and sickly-looking from the bankrupt diet of cheap carbohydrates and synthetic proteins that are all we have left. Like you, I'm trapped in a rat warren of dusty gray concrete; tracked by the omnivorous, all-powerful net; sucking in sulfurous air; badly outnumbered; mostly numbed. I'm scarred, scared, hunted, and all too human.

What energy I have left is fueled by rage—by the incendiary and explosive rage of a dying, decimated planet!

I look around at the garbage-strewn, high-tech squalor here and see in the murky distance that much better place—pristine Pandora, opalescent in the velvet darkness. Our hope and salvation lies in her fertile and gracious beauty; in the panoply of her brilliantly colored flora and fauna; in her fierce and bountiful mother-love.

But the insidious greed of the megacorporations has breached planetary boundaries. It's spreading over Pandora like a fast-growing fungus, wreaking destruction of a deliberate force and calculated magnitude not seen since the demolition of our once-proud Earth.

Know that you are in extreme danger. The document you have received is critical to the survival of Pandora and to your survival here on Earth. It's composed of purloined notes, stolen files smuggled off the moon, hijacked data mined in ways I can't reveal and by people—growing and courageous—who have risked their lives to disseminate these truths.

There is no guarantee of the accuracy of this information. But either way, they don't want you to have it. They want you to stay stunned and stupid, in bovinelike complacency, chewing carefully manufactured lies. Use extreme caution. They are watching, hidden in the tall grass of the ever-present web, waiting. . . .

So organize! Enlist others! Propagate the hard and painful truth! Stop the spread of the lethal corporate poison!

Think of the hope of Pandora and of the Na'vi. They have little or no technology. Yet it is we who scrape for survival while they feast on the bounty of a thriving land, teeming with life. Can the knowledge of a sacred world steer us away from a terrible fate? Perhaps not. We know the truth. It may be the only hope for Pandora and for our sad and battered Earth. Ask yourself: If we can't save Pandora, how can we save ourselves?

Join us and fight. Fight for Pandora! Fight for Earth! Fight for your own survival!



# 1 ASTRONOMY AND GEOLOGY

At a distance of 4.37 light-years from Earth, the Alpha Centauri system is our nearest stellar neighbor. Although it appears as a single star, it is actually a trinary system that consists of two sunlike stars, Alpha Centauri A, Alpha Centauri B, and a red dwarf, Alpha Centauri C. Its largest member, Alpha Centauri A (or ACA to astronomers), serves as the sun for Pandora, a large moon that orbits the planet Polyphemus.

Pandora's proximity to Polyphemus and the other two closest moons produce tidal heating that helps increase rapid continental drift. This

creates intense vulcanism and fractures large continental landmasses, moderating the moon's weather. The unique substance "unobtainium" has helped create a myriad of remarkable geological formations through its superconducting magnetic properties. These include the famous Hallelujah Mountains and the Stone Arches. Despite Pandora's alien landscape, there are Earth-like valleys, mountaintops, beaches, and lakes. Its unmarred beauty has sparked the imagination of Terrans everywhere.

The discovery and subsequent exploration of the Alpha Centauri system is one of the great achievements in science. But it is unobtainium that brought humans to Pandora. And, despite the enormous danger, it is why the RDA and its colonists remain there today.



# PANDORA

**LOCATION:** A moon of Polyphemus, a gas giant planet orbiting the star Alpha Centauri A, roughly 4.4 light-years from Earth

**ENVIRONMENT:** Earth-like, but humans cannot breathe its air without an exopack

**INHABITANTS:** Na'vi, a highly intelligent humanoid race with a Neolithic society

**RESOURCES:** The only known source of unobtainium, a superconductor vital to Earth's economy



Although Pandora is a satellite of Polyphemus, it has much more in common with Earth than with our moon. Similar in size, atmosphere, and appearance, it has continents and islands surrounded by seas of a familiar blue hue. Clouds range in color from fluffy white to towering dark thunderheads. The landforms have mountains, valleys, plains, lakes, and rivers. Plant life is everywhere; forests and meadows cover much of the land, and rafts of floating seaweed dot the oceans. Vast

herds of grazing animals roam the open prairie and huge flying creatures fill the skies.

Much of the plant life often contains chemical compounds that render it unfit for human consumption. Many of the species have poisonous thorns or pods that burst and spray acid sap. The animal life is also dangerous to humans. Thickly armored hammerheads are unstoppable with standard-issue assault rifles. Flying *ikran*, or "banshees," swoop down to snatch the unwary. Many smaller animals and insects, like the stingbat and hellfire wasp, have extremely potent venom. The native inhabitants are fierce warriors, and humans underestimate Na'vi capabilities at their own peril.

Yet Pandora has a beauty unsurpassed by anything on Earth. In the Pandoran night, every living thing blazes with phosphorescent rainbow hues—a flashing, flickering phantasmagoria of images that can quickly hypnotize a newcomer. On a spiritual level, it is believed there is a strange harmony that pervades all Pandoran life. The few humans who have embraced it say they experience a peace they have never known before.

The mysterious beauty of Pandora and knowledge of its sentient creatures have sparked the imagination of billions on Earth.

## DISCOVERY

When astronomers turned a powerful space-based telescope toward the Alpha Centauri system and one of its planets, Polyphemus, they were stunned to find a moon that had an atmosphere with the spectroscopic signature of free oxygen, in a concentration almost equal to Earth's.

Given the presence of oxygen, scientists believed that the moon could harbor life. Even more intriguing was the splitting of spectrographic lines that indicated the presence of intense magnetic fields, far stronger than any known outside of a star's interior.

This spurred the construction of even larger space telescopes. They revealed Pandora to be a verdant Earth-like world in the star system nearest to our own.

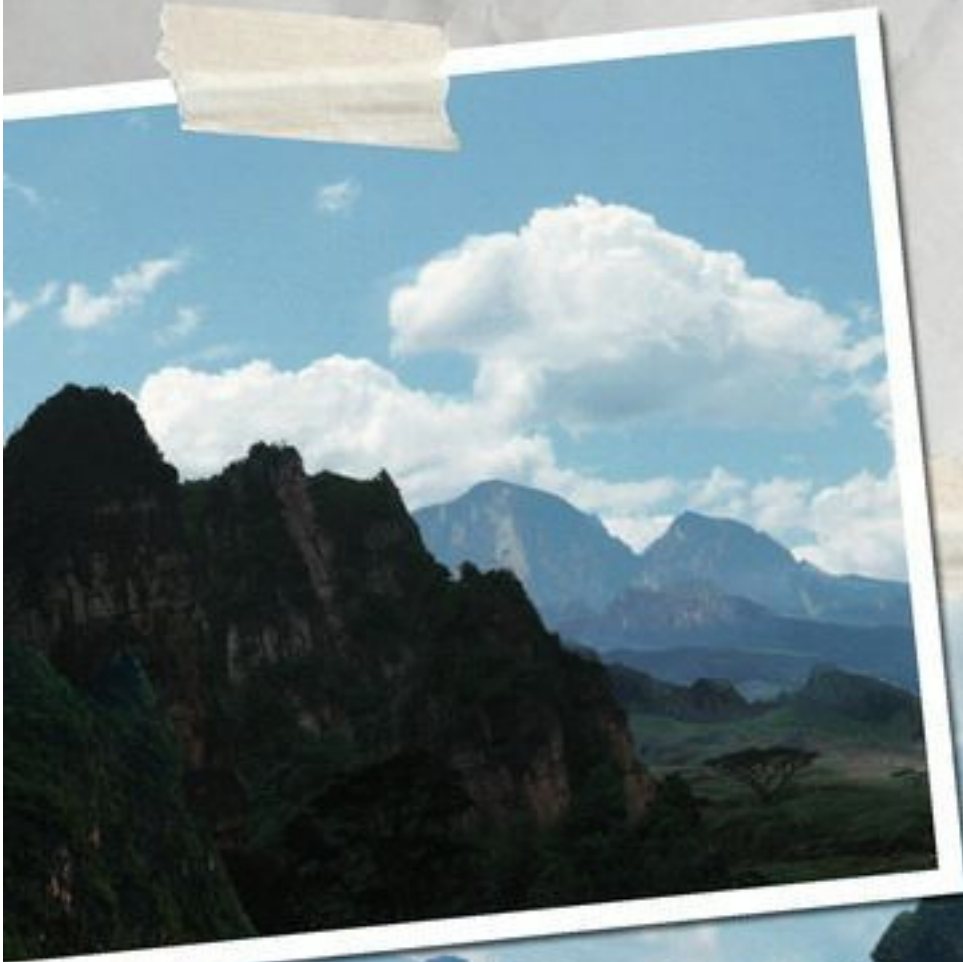
A subsequent unmanned mission led to the discovery of a world teeming with plants, animals, and geological oddities.

The research craft also discovered the source of the intense magnetic fields, a substance that had the remarkable property of high-temperature superconductivity.

It was this substance, later named unobtainium, that made it financially feasible to launch the manned exploration of Pandora. But it was the image of the Na'vi that empowered the world to come together to embrace the first manned mission to another star system.

**PHYSICAL CHARACTERISTICS**

World	Diameter (kilometers)	Mass	Surface Gravity	Atmospheric Density	Surface Pressure
Earth	1275.27	1	1	1	1
Pandora	11447	0.72	0.8	1.2	1.1



## GEOLOGY

Enormous magnetic storms caused by interactions with Polyphemus's magnetic field. Deadly animals. Toxic atmosphere. Unsurpassed beauty and spiritual harmony.

Pandora's physical construction resembles Earth's: a liquid iron core, a plastic mantle, and a semirigid crust. Like Earth, it has two internal heat sources: the disintegration of radio-

active isotopes, and energy from the gravitational collapse of its initial formation. But there is an additional and much larger energy input from tidal forces; the nearest inner and outer moons pull on it in contest with Polyphemus.

This excess of energy drives continental drift at a much faster rate than on Earth, causing the tectonic plates to fracture more extensively because of the increased stress. This explains the lack of large continents on Pandora, as well as its vulcanism and geothermal activity.

Though Pandora's land-to-water ratio is greater than Earth's, the land is broken up into a larger number of smaller continents, creating more coastline and fewer inland regions than on Earth. The moderating influence of the proximity of the continental interiors to the oceans reduces extremes in temperature. Polar ice caps comparable to Earth's exist, but because there are no landmasses in the polar areas, the Pandoran ice caps are currently free-floating.

Pandora is more volcanically active than Earth. There are vents both on the land and under the oceans. Many of the mountains and other surface features are of recent volcanic origin. Numerous hot springs and geysers dot the landscape, and there are several rivers that are almost boiling at the place where they erupt from underground aquifers.

## MAGNETIC FIELDS

Pandora possesses a liquid iron core, with circulating currents that produce a dipole field similar in structure to the Earth's, but the presence of unobtainium deposits deep below the surface magnifies its strength hundreds of times. This enhanced field shields the surface from cosmic rays or material ejected from Alpha Centauri A, but unlike Earth, these intense magnetic fields are not as uniform, and concentrated unobtainium deposits produce localized distortions to the worldwide field that can act as magnetic funnels. These anomalies can channel incoming particles ejected from the sun to the moon's surface. Any life-form unlucky enough to be caught in one of these



areas during a stellar flare event or CME (Coronal Mass Ejection) will be quickly irradiated with a lethal dose. Depending on the type and amount of radiation, death can occur instantly as brain tissue is ionized and effectively “shorts out,” or be delayed for agonizing days or weeks as the tissue slowly necrotizes.

Pandora’s global field also interacts with Polyphemus’s much more extensive one. This can divert radiation trapped in the planet’s magnetic field to the moon’s surface—also with unpleasant results. Additionally, the configuration of these two fields produces a “magnetic flux tube” that links the polar areas of the planet and satellite with an electrical current flow of millions of amperes. This causes a gigantic increase in electrical activity on both bodies, with massive auroral storms and other electromagnetic phenomena.

## ATMOSPHERE

AVATAR B

Pandora is not Earth, and its paradise is deceiving. The nitrogen-oxygen atmosphere is 20 percent denser than our own. It contains so much carbon dioxide (more than 18 percent) that humans who breathe it directly will rapidly lose consciousness and die. Another gas, hydrogen



sulfide, is spewed out by pervasive vulcanism, and is toxic in concentrations far less than 1 percent. It must be removed by the exopack's mask along with the  $\text{CO}_2$ . The heavy gas xenon comprises about 5.5 percent of Pandora's atmosphere, and is responsible for much of the increased air density. Although Pandora's air is denser than Earth's, the sea level pressure is about 10 percent less, in part because the moon's gravity is only 80 percent of Earth's.



# AMP SUIT

**FUNCTION:** Ambulatory weapons platform for military and civilian operations in hostile and toxic environments

**OFFICIAL NAME:** MK-6 Amplified Mobility Platform

**NA'VI NAME:** "Shield that walks" or "Not-demon walking"

**SIZE AND WEIGHT:** 4 meters in height, 1.83 meters wide

**WEAPONRY:** Shoulder-slung and detachable GAU 90 30-millimeter cannon. Belt-fed ammo runs through feed chute. Optional flame thrower, slashing blade.



The Amplified Mobility Platform (or "AMP Suit") is a refinement of a military exoskeleton device first used on Earth in the early twenty-first century and refined during wars over the decades. Sealed models for toxic environments were developed and, with the colonization of the moon and Mars, pressurized versions with full life-support systems were employed in great numbers.

The AMP Suit is a powerful all-terrain ground combat unit designed for use by infantry. It can survive the most hostile foe, be it alien or human, and cut a swath through difficult landscapes and strong enemy positions. Its enclosed cab and "BIBS" (Built-in-Breathing system) also allows RDA personnel to perform civilian and military duties in a variety of toxic atmospheres.

Although an operator can learn to adequately manipulate the unit in combat conditions with less than two months of training, it takes months longer to master the transition from a supine to an upright position. However, with the gyroscope and the operator's deft control, very few AMP Suits topple. Its auto balance technology automatically compensates for shifts in the AMP Suit's center of gravity, whether it is used for standing, walking, or lifting heavy loads.

If the operator has been injured or killed, the AMP Suit has an unmanned "walk-back" capability on battery power. This feature was developed to protect the significant capital investment made in each suit.

Not designed for Pandora, but suit is effective protection from toxic plants, swarms of stinging, aggressive insects, and other biting creatures.

EVEN WITH GYROS AND STABILITY CHIPS, IT'S EASIER TO KNOCK DOWN THAN THEY LET ON. A LENGTH OF WIRE CABLE, PROPERLY PLACED, DOES THE TRICK. CANNON'S AMMO FEED LINE HAS BEEN KNOWN TO JAM.

# EXOPACK

Developed from civilian rebreather technology, the exopack is a lightweight atmosphere filtration system that allows humans to survive on Pandora with minimum equipment.

Pandora's atmosphere would be easily breathable—if it wasn't contaminated by a pungent mixture of carbon dioxide, xenon, and hydrogen sulfide. The additional gases cause a variety of unpleasant reactions, including choking and burning of mucous membranes, followed by unconsciousness within twenty seconds and death within four minutes.

Nevertheless, the partial pressure of oxygen in the Pandoran atmosphere is similar to that of Earth's atmosphere. In order to breathe, it is only necessary to filter out the toxic components.

The filters will function for two weeks before accumulated soot clogs the filter pores. The filter pads can be regenerated by gentle washing with running water and will last indefinitely with proper care.

A polymer static rim around the exopack mask ensures a light, tight seal around the face.

READ CAREFULLY—  
WON'T BE LONG  
BEFORE WE'RE ALL  
USING THESE ON  
EARTH. SOME OF OUR  
PEOPLE HAVE  
REPLICATED THEM  
FOR FIELDWORK IN  
THE EASTERN DEAD  
ZONES. ANOTHER FINE  
PRODUCT BROUGHT  
TO YOU BY THE RDA!

AVATAR 12



# ALPHA CENTAURI SYSTEM

**LOCATION:** 4.37 light-years from Earth

**DESCRIPTION:** Alpha Centauri, the brightest "star" in the constellation of Centaurus, when seen through a telescope, is, in fact, three stars orbiting around one another. This triple star system consists of two sun-like stars, Alpha Centauri A, Alpha Centauri B, and a red dwarf, Alpha Centauri C.

Alpha Centauri is a trinary star system, and Earth's closest stellar neighbor outside the solar system. Alpha Centauri A (or ACA to astronomers) is the largest member, at about 20 percent larger than our sun. ACA is only notable because it serves as the sun for Pandora, the home of the only other sentient race discovered to date.

Alpha Centauri B (ACB) is about 15 percent smaller than our sun, and noticeably orange because it is five hundred kelvins cooler than its neighboring star. Alpha Centauri C (ACC) is a red dwarf, only 20 percent of the size of the sun and less than half its temperature. ACC gives off only a dim red glow instead of the bright yellow glare of the sun and ACA.

## DISCOVERY

Early telescopic and unmanned exploration showed the ACA was full of surprises. The planet Coeus, which is located in the center of ACA's habitable zone, sported a huge eye-shaped storm, many times larger than Jupiter's Great Red Spot. Astronomers renamed the planet "Polyphemus" after the one-eyed cyclops encountered by Odysseus, the hero of Homer's epic poem.

More striking than Polyphemus's huge storm were its moons: clouds and oceans were visible on several of the moons larger





than 6,437 kilometers in diameter. Remote sensing revealed nitrogen-oxygen atmospheres on the fifth and sixth moons; this type of atmosphere could only be produced by carbon-cycle life-forms. Though some of the other large satellites had significant bodies of surface water, their thinner atmospheres were mostly nitrogen and carbon dioxide, which is an indication of lifelessness.



AVATAR 14

# POLYPHEMUS

**LOCATION:** The second of three gas giant planets orbiting the star Alpha Centauri A

**DESCRIPTION:** Smaller than Saturn. One of its moons, Pandora, is home to the Na'vi.

Polyphemus is a gas giant planet, similar to our own Saturn, but without its rings. But unlike that planet, which is located in the outer reaches of our solar system, Polyphemus orbits Alpha Centauri A at a distance comparable to Earth's orbit of the Sun. Because Polyphemus formed in a higher-temperature environment than Saturn, it is composed of a much larger proportion of helium and other heavier elements, and has a greater mass for its size.

Polyphemus has more prominent banding than Saturn, although its bands are not as spectacular as Jupiter's. But Polyphemus has a vortex storm far exceeding Jupiter's Great Red Spot in size and turbulence. Auroral activity is near-continuous and intense enough to be visible in daylight. When magnetic flux tubes form and link to various satellites, they too display brilliant auroral bands in the moons' polar regions, where the tubes' flux joins the global ones.

Polyphemus has fourteen satellites, including Pandora. The two outer moons orbit in the opposite direction from all the others.

The chemical "stew" in its atmosphere is stirred by convection currents and gale-force winds produced by the planet's rapid rotation. The result is a brilliant display of an ever-changing pattern of colored cloud belts and rotating storms.

A large and a small planetoid share Polyphemus's orbit, occupying the pseudostable Lagrangian Points L4 and L5, located 60 degrees ahead of and behind Polyphemus.



# UNOBTANIUM

**FUNCTION:** Vital for matter-antimatter energy generators, interstellar and deep space travel, Superluminal Communications, and operation of maglev trains

**PROPERTIES:** A high-temperature superconductor that is capable of both repelling magnetic fields and trapping them within itself

**APPEARANCE:** Metallic, silver-gray cubic crystal

**LOCATION:** A naturally occurring substance found only on Pandora



AVATAR 16

Modern civilization is dependent on superconductive technology to help fuel the economy. In addition, many specialized applications such as Superluminal Communications and computer hyperchip manufacturing would be impossible without it.



When the world's first high-temperature superconductor was created in the late twentieth century, it proved to be useless because of inherent instabilities. Further efforts proved futile, and researchers finally termed their goal "unobtainium" (the spelling was later changed to "unobtanium" to conform to chemical element naming, although unobtanium is a compound, not an element). Their matters stood until the first unmanned exploration vehicle reached Alpha Centauri A and discovered deposits of a high-temperature superconducting substance on an Earth-like moon named Pandora—unobtanium had been obtained at last.

When the first sample of unobtanium was extracted from its ore, it was found to contain an extremely strong magnetic field. This was a complete violation of everything then known about superconductors—they repel magnetic fields. Scientists were baffled until microscanning revealed the first of unobtanium's many secrets—unlike the fragile crystals of human-created superconducting compounds, the substance found on Pandora was a stable quasicrystal with its atoms arranged in a never-repeating but orderly pattern with fivefold symmetry. This structure is not only mechanically rugged but also has microscopic voids in the quasicrystalline structure that contain the magnetic flux lines.

Pandoran unobtanium beat the best superconductor that humans had ever created. It remained superconducting up to its melting point of  $1,516^{\circ}\text{C}$  ( $2,761^{\circ}\text{F}$ )! Unobtanium was also incredibly resistant to magnetic fields, remaining superconducting when surrounded by a field of one billion gauss (one hundred thousand teslas), more than a thousand times better than any Terran material.

Researchers theorize that billions of years ago, when the planets and satellites of the Alpha Centauri system were condensing from the primordial stellar nebula, a Mars-sized planetesimal may have crashed into the still-molten Pandora. The moon's nickel-iron core was disrupted. The high temperatures and pressures produced in the collision far exceeded anything wrought by human technology. These forces interacted with Polyphemus's intense magnetic field and created conditions suitable for the production of this unique substance.

Refined product has current market value of forty million dollars per kilo. Vital to Earth economy.

THE DESTRUCTION OF PANDORA WILL CONTINUE AS LONG AS THE RDA CAN SUCCESSFULLY SUPPRESS ANY ATTEMPT TO DEVELOP A TERRAN ALTERNATIVE TO UNOBTANIUM. THIS MATERIAL IS THE ULTIMATE MOTIVATION FOR EXPLORATION AND COLONIZATION OF PANDORA AND REPRESSION OF THE NA'VI. BRUTAL BLACK MARKET HELPS FUND TERRORIST GROUPS. ONE SWISS MOBSTER REPORTEDLY WEARS RING MADE FROM UNOBTANIUM.

## SUPERCONDUCTIVITY

Superconductivity is the property of certain materials to conduct electricity with absolutely no resistance and thus no loss of electrical energy dissipated as heat in the wire. It is a manifestation of quantum physics, rather than just the normal reduction of electrical resistance with temperature. Superconducting materials also have unique magnetic properties.

Modern civilization is dependent on superconductive technology for the major areas of power generation, transportation, and interstellar travel. In addition, many specialized applications such as Superluminal Communications and computer hyperchip manufacturing would be impossible without it.

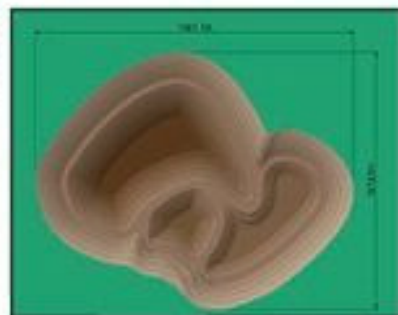
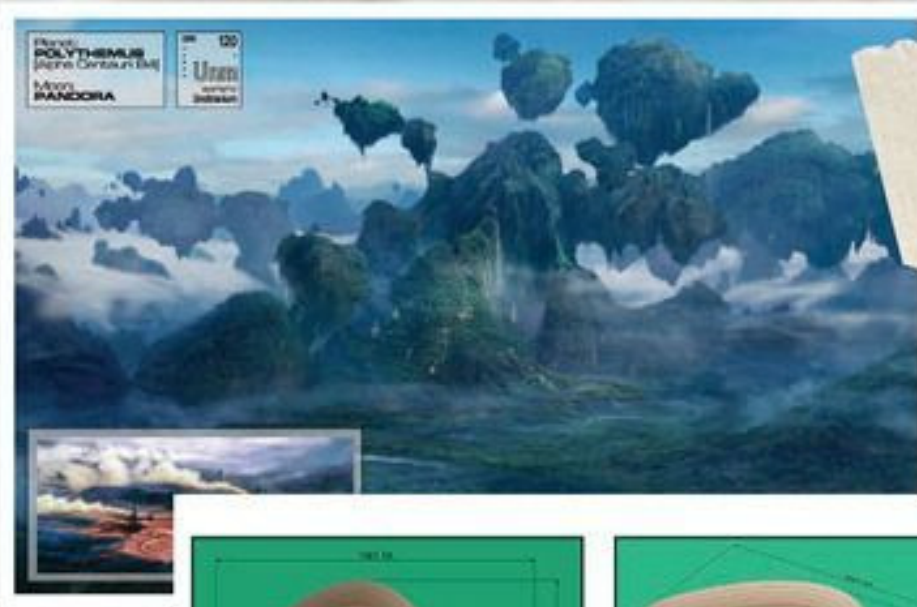
Ordinary electrical conductivity occurs when the outer (valence) electrons of an atom are not strongly bound and can be freed with very little effort. Metals are the prime example of a conductive material, particularly copper, silver, and gold. However, the resistance of metal wire is not zero. Some of the electrical energy is converted to heat as the current passes through the wire. This requires that an electrical conductor have a large diameter in order to carry large amounts of current, both to reduce the overall resistance and to prevent the wire from heating to its melting point.

Superconductivity is the result of an entirely different phenomenon from that which occurs in ordinary conductors at lowered temperatures. Even now, in the twenty-second century, it is not completely understood. In essence, superconductivity requires that electrons carrying electrical energy pair up and move in perfect unison, unlike those in a

normal conductor, which jostle one another in a mad rush toward the finish line. Superconductivity was initially discovered only at temperatures very near absolute zero and was considered merely a laboratory curiosity. But over the centuries, substances were created that superconducted at higher and higher temperatures. Today, they function at well above the boiling point of water ( $100^{\circ}\text{C} = 212^{\circ}\text{F}$ ).

Whenever an electrical current flows, it creates a magnetic field. One of the properties of superconducting material is the ability to repel such fields. The repulsion is so strong that a piece of superconducting material will float on a magnetic field.

Much research has been done to improve superconductors' resistance to magnetic penetration. As of today, unobtanium has by far the best performance. Under certain circumstances, it is even possible to trap an intense magnetic field within unobtanium. This unique and baffling property has opened up many new applications and areas for research.



PLAN



SECTION

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PERSPECTIVE

**EXCAVATION - WHEEL LOADER**

TOTAL PIT DISPLACEMENT	78,000,000 m <sup>3</sup>
Wheel Loader (1-80' @ shovel wheel)	10,000 m <sup>3</sup> /hr
	828 days

**ORE/TAILING REMOVAL - TRUCKS**

TOTAL PIT DISPLACEMENT	78,000,000 m <sup>3</sup>
Dump Trucks (4000 m <sup>3</sup> /load)	120,000 loads
3 platoons - 20 dump trucks per	375 loads/day
	536 days

# GLOSSARY

**AILERONS.** Hinged control surfaces on the back of a wing, including those on the Valkyrie shuttle. Used to control lateral balance of the craft.

**AMNIO TANK.** Large tank used to grow genetically engineered avatar bodies during flight from Earth to Pandora. Similar devices are widely used on Earth for organ regeneration.

**APEX PREDATOR.** A predator, such as the thanator or great leonopteryx, that is at the top of the food chain in its area and is not preyed upon by other creatures.

**ARBOREAL.** Referring to a creature who lives and feeds in trees, such as the prolemuris.

**AURORAL.** Referring to the brilliant displays of light that appear in the upper atmosphere, usually near polar regions. Caused by the ex-

citation of atoms due to magnetic fields. Because of Pandora's intense magnetic fields, auroral displays are more dramatic than on Earth.

**BIOFUELS.** Any fuel derived from processed living matter, usually vegetative.

**BIOME.** A region of distinct flora and fauna, such as the rainforests of Pandora.

**BIOREMEDIATION.** The use of plants, fungi, or microorganisms to restore an environment to a cleaner, more natural condition. Many of the plants on Pandora have the ability to absorb toxins, which could have implications on Earth.

**BIOTA.** The flora and fauna within a specific region or time period: the biota of the floating mountains or the biota of the Jurassic period.

**CANOPY.** Upper layer of forest, usually the tops of trees.

**CHITINOUS.** Referring to chitin, a very hard long-chain organic polymer found in the walls of fungi, exoskeletons, and beaks. Many Pandoran creatures have chitinous formations that are used as natural armor.

**CONTINENTAL DRIFT.** The movement of continents over geologic time. The term is something of a misnomer, since it refers to the now-discounted belief that continents "drifted" over the Earth's liquid core. The theory has now been replaced with confirmed studies of plate tectonics, although

the term "continental drift" is still widely used to describe the movement of continents. Because of various natural forces, Pandora has a much higher rate of continental drift.

**DELTA WINGS.** Aircraft wings, such as those on the Valkyrie shuttle, which have a triangular shape when viewed from above.

**ELECTROCYTES.** Organic cells used by animals, including the medusa, to generate and transfer electricity and electrical signals. The cells are positively charged on one side, and negatively charged on the other.

**EPIPHYTE.** A plant that grows on top of another plant as structural support. They are not parasitic. Often found in rainforest canopies.

**EYWA.** Guiding force and deity of Pandora and the Na'vi. Sometimes scientists hypothesize that all living things on Pandora connect to Eywa through a system of neuro-conductive antenna. Some believe interconnectedness, which on Earth is often considered a spiritual concept, exists in a physical and tangible way on Pandora. The Na'vi believe that Eywa, in turn, acts to keep the ecosystems of Pandora in perfect balance.

**FERROMAGNETIC.** A material that is susceptible to magnetic fields

and magnetization. Because of Pandoran magnetic fields, mining equipment must be made of exotic and expensive nonferromagnetic material.

**GLOTTAL STOP.** A consonant sound created when vocal cords are constricted and released, as when saying "uh-oh." Used both by the Na'vi on Pandora (mostly in song) and various aboriginal Earth races.

**HYDROGEN SULFIDE.** A colorless, toxic gas present in the Pandoran atmosphere. One of several gases that necessitate the use of an exopack by human colonists.

**LAGRANGIAN POINTS.** A point in space at which there is a balance between the gravitational forces of two larger bodies and the orbital motion of a third smaller body.

**LOU GEHRIG'S DISEASE.** Amyotrophic lateral sclerosis—a progressive neurological disease named after a famed baseball player of the early twentieth century. The disease is caused by the degeneration of motor neurons. Stephen Hawking, the famed twenty-first-century physicist, suffered from the disease. Several toxic plants on Pandora, including the cycad, contain a poison that can cause symptoms similar to the disease.

**MAGNETIC FLUX LINES.** Lines of a magnetic field that emanate from

a magnetized object.

**MAGNETIC FLUX TUBE.** A tube-shaped area of space that contains a magnetic field that is more powerful than surrounding areas. Common around stars, including our own sun, especially in areas of sunspots. In some conditions, a flux tube can form between Pandora and Polyphemus, creating a powerful electrical current between the two bodies and resultant lightning storms.

**MICROTONAL.** Referring to music that uses intervals smaller than those between the twelve notes of traditional Western music.

**NACELLES.** A cover that houses engines, fuel, or equipment on an aircraft.

**NEOLITHIC:** Stage in human development in the later part of Stone Age when use of polished, ground weapons became prevalent. Na'vi are said to live in a Neolithic society, although in many ways they are much further advanced than the human precedent.

**OFFAL.** Internal organs of animals, sometimes used as a food source but often discarded. Related to the word "awful."

**OVERBURDEN.** In mining, the (soil, rock, mud, etc., that covers the material to be mined.

**PANGAEA.** Geologists theorize that some 250 million years ago, one

supercontinent existed and later broke up to form the existing continents. The land mass was named Pangaea by Alfred Wegener, the scientist who developed the theory of continental drift.

**PERMALLOY.** Specifically, an alloy comprised of nickel and iron. But the term has come to refer to a wide class of superstrength, lightweight composite alloys that can resist magnetic fields. Used in aircraft and spacecraft because of their properties.

**PEYOTE SONGS.** A form of musical ritual performed by Native Americans of the Southwest. Sung in conjunction with the ritual use of peyote, a cactus that contains psychoactive alkaloids. Peyote rituals are similar to the Uniltaron ceremony of the Na'vi on Pandora.

**PLANIMAL.** Colloquial term for zooplantae, or hybrid life-form that has characteristics of both plant and animal.

**POLYGYNY.** Mating structure in which the male has two or more female mates.

**POSITIVE FEEDBACK.** The amplification of a force or effect, e.g., when one wave magnifies another's force.

**PREHENSILE.** Description of a tail that is able to grasp, such as that of the prolemuris or the Na'vi.

**PSIONIC LINK OR PSILINK.** Array

of devices used to project cognitive commands into external biological unit. Used to project consciousness of avatar operator into avatar body.

**PSYCHOACTIVE.** A drug or substance that acts upon the central nervous system, either to change mood and behavior or to create hallucinations. Several creatures on Pandora, including the arachnoid, contain psychoactive venom.

**RIVER BLINDNESS (ONCHOCERCIASIS).** An infectious form of blindness transmitted through the bite of a black fly and caused by a nematode that can live for up to fifteen years in the human body. A hundred million people are infected with this parasite.

**SCATOLOGY.** The study of animal feces to provide information on diet, range, and overall health.

**SITE 26.** Small, remote outpost on one of the floating mountains. Contains psilink unit.

**TREE OF SOULS.** Found near Home-tree, it is one of the Na'vi most sacred sites. The Na'vi believe it is the strongest manifestation of Eywa on Pandora.

**TREE OF VOICES.** Willowlike tree that the Na'vi believe allows the Omaticaya to commune with both their ancestors and Eywa by entwining their queues with the roots of the tree.

**UNGULATES.** Name means "hoofed animal." Term refers to groups of mammals, such as zebra, donkeys, and horses. Several species on Pandora, including the hammerhead titanothera, have been found to have features, including chewing habits, that are similar to Terran ungulates.

**UNILTARON.** Na'vi ceremony in which a prospective warrior ingests psychoactive agents. Subsequent hallucinations are believed to be revelatory by Na'vi. Similar to mescaline ceremonies of Native Americans of the Southwest.

**VACUOLE.** Membrane in cells of plants and fungi that create enclosed compartments serving a variety of functions, including storage of liquid or sequestration of toxins.

**VULCANISM.** The presence of volcanic activity in a region. Pandora has a pronounced degree of vulcanism that has increased the

density of the atmosphere.

**VTOL.** Abbreviation for vertical takeoff and landing. Includes helicopters and some fixed-wing aircraft.

**WOODSPRITE.** A small, floating seedpod from the willowlike "sacred tree." The Na'vi believe that woodsprites are portents or "signs" from Eywa. Known as *atokirina* by the Na'vi.

**XENOBOTANY.** The study of plant life on planets other than Earth. Until the discovery of Pandora, this was largely a theoretical subject, but it is now at the forefront of science.

**XENOMUSICOLOGISTS.** Musicologists who study the music of off-Earth cultures. The field was largely theoretical until the discovery of the Na'vi. Funding for this once-esoteric subject skyrocketed with discovery of Na'vi.



# NA'VI-ENGLISH DICTIONARY

## NA'VI

'ampi  
'aw  
'awkx  
'awpo  
'awsiteng  
'awve  
'e'al  
'eko  
'ekong  
'engeng  
'eveng  
'evi  
'i'awn  
'iheyu  
'Inglisi  
'it  
'itan  
'ite  
'ok  
'ong  
'upe  
'upxare

a  
āie

## ENGLISH

touch  
one  
cliff  
one individual  
together  
first  
worst  
attack  
beat (rhythmic)  
level  
child  
kid (affectionate form of "child")  
remain, stay  
spiral  
English language  
bit, small amount  
son  
daughter  
remembrance  
unfold, blossom  
what (thing)  
message

which, that  
vision

alaksi	ready
alim	far away, at a distance
Amhul	child's name
Änsit	child's name
apxa	large
atan	light
atokirina'	atokirina, seeds of the great tree
ätxäle	request
atxkxe	land
au	drum (made of skin)
aungia	sign, omen
ayfo (ayfo)	they
aylaru	to the others (contraction of <i>aylaberu</i> )
aynga	you
ayoe	we (exclusive)
ayoeng	we (inclusive)

ean	blue
eltu	brain
eltu si	pay attention, quit goofing off
eltungawng	brainworm
emza'u	pass (a test)
go	before, in front of
eyk	lead
eyktan	leader
Eywa	Eywa PN
Eywa ngahu	good-bye, Eywa (be with you)

fa	with (by means of)
faheu	smell
fi'u	this (thing)
fifya	this way, like this
fikem	this (action)
fipo	this one (person or thing)
fiseng(e)	here, this place
fkarut	peel
fkeu	mighty
fko	one

fɪmawn	news, something to report
fɪmɛtok	test
fɪmi	try
fɪnu	quiet (= be quiet)
fɪo	they
fɪpɛk	hold off, suspend action
fɪpɛ'	send
fɪpɛjo	challenge (ceremonial)
fɪpi	for the sake of
fɪpɒm	well-being; peace
fɪpɛxɛfaw	medusa (animal)
fɪpɛxɛkɪm	enter
fɪrɛ'u	everything
fɪrapo	everyone
fɪtɛng	stop
fɪtɛ	so that
fɪtɛkɛ	so that not, lest
fɪtɛɛ	study
fɪtu	from (direction)
fɪtɛ	easy
fɪtɛxɛy	choose
fɪu	or
fɪyɛ'o	path, way
fɪyɛpɛ	how
fɪyɛwɪntɛxu	guide

hɛ	So ( or "in that case")
hɛpɛxi	part
hɛsɛy	done, finished
hɛwɪnu	protect, shelter
hi'i	small
hiyɪk	funny (strange)
hɛrrɛp	danger
hu	with (accompaniment)
hufwɛ	wind
hum	leave, depart

i'en	stringed instrument
Ikɛnimɛyɛ	Stairway to Heaven

ikran	ikran, mountain banshee
ilā (also: ilä)	by, via, following
ioang	animal, beast
irayo	thank you
ka	across
kā	go
kaltxi	hello
kāmakto	ride out
kame	see (spiritual sense)
kangay	valid
karyu	teacher
kato	rhythm
kawkr	never
kawng	bad, evil
kawtu	no one
ke	not
ke'u	nothing
kea	no (before a noun)
kehe	no
kelku	home
kelku si	live, dwell
Kelutral	Hometree
kempe	what (action)
kenong	model, represent, exemplify
kerusey	dead
ketuwong	alien
kewong	alien
keye'ung	insanity
ki'ong	kind of fruit or vegetable
kifkey	world (physical, solid)
kim	spin
kin	need
kinä	seven
kinam	leg
kinamtil	knee
king	thread
kip	among
kite'e	service

kiyevame	good-bye, see you again soon
klfrivo'	be responsible
klk <del>u</del> lat	dig up
klkx <del>e</del> m	stand
klpx <del>i</del> tu	territory
klte	ground
krr	time
krrnekx	take/consume time
krrpe	when
k <del>u</del> nsip	gunship
kurakx	drive out
kxam	middle, midpoint
kxamtseng	center (or place in the middle)
kx <del>a</del> ngangang	boom
kxani	forbidden
kxawm	perhaps, maybe
kxener	kind of fruit or vegetable
kxetse	tail

lahe	other
lam	seem, appear
lapo	other one (person or thing)
latem	change
law	clear, certain
lehrrap	dangerous
lertu	colleague
li'u	word
lok	close to
lonu	release, let go
lrrtok	smile
lu	be (am, is, are)
lumpe	why

makto	ride
mawey	calm
mefo	they (those two)
menari	eyes (two)
me <del>u</del> ia	honor
meyp	weak

mi  
mikyun  
min  
miso  
mlle  
moe  
mokri  
muiä  
mun'j  
mune  
munge  
muntxa

na  
na'ring  
Na'vi  
nang  
nantang  
nari  
nari si  
nawm  
ne  
ne klle!  
ne im  
nekx  
neto  
neu  
nga  
ngawng  
ngay  
ngenga  
ngop  
ni'aw  
ni'awtu  
ni'awve  
ni'it  
ni'ul  
niä  
Niayoeg

in  
ear  
turn  
away (position)  
agree  
we two (exclusive)  
voice  
proper, fair, right  
cut  
two  
take, bring  
mated

like, as  
forest  
Na'vi; the people  
particle for surprise or exclamation  
viperwolf  
eye  
watch out, be careful  
great, noble  
to (direction)  
get down! (literally, "to the ground!")  
back (direction)  
burn, consume  
away (direction)  
want  
you  
worm  
true  
you (honorific form)  
create  
only  
alone (as one person)  
first  
small amount, a bit  
more  
grab  
like us

(pronounced nayweng)

niftue	easily
nifrxavang	passionately, with all heart
nihawng	too, excessively
niltsan	well
nimun	again
nin	look at
ningay	truly
nitam	enough
nitut	continually
nitxan	much
niwin	fast
niwotx	all (of), in toto, completely
<u>nulkr</u>	longer (time)
nume	learn
<u>oe</u>	I
oeng	we two (you and I)
<u>ohe</u>	I (deferential or ceremonial form)
olo'	clan
<u>olo'eyktan</u>	clan leader
Omatikaya	Omaticaya
<u>omum</u>	know
<u>ontu</u>	nose
<u>pāhem</u>	arrive
pak	particle for disparagement
<u>palulukan</u>	thanator
pam	sound
<u>pamtseo</u>	music
<u>pānuting</u>	promise (a thing to someone)
<u>pātsi</u>	badge
pawm	ask
pe	what (before a noun)
pefya	how
pehem	what (action)
pehrr	when
pelun	why
peng	tell

peseng	where
pesu	who
peu	what (thing)
pey	wait
pizayu	ancestor
plltxe	speak
po	he, she
poan	he
pog	she
pongu	group of people, party
pxan	worthy
pxasul	fresh, appealing as food
pxay	many
pxel	like, as
pxi	sharp
pxun	arm
pxuntil	elbow

rāā	do not
ral	meaning
ralpeng	interpret
Ralu	child's name
rawke	alarm cry
renu	pattern
rey	live
rikx	move, shift position
rim	yellow
rina'	seed
riti	stingbat
rol	sing
ronsem	mind
rutxe	please

sa'nok	mother
san	saying; quote
sa'nu	mommy
sānume	teaching, instruction
sat	that (after <i>fū</i> only)
sempu	daddy



tam	suffice, "do"
tangek	trunk (of a tree)
tan <u>hi</u>	star
taron	hunt
taronyu	hunter
taw	sky
tawng	dive
tawng	duck
<u>Taw</u> tute	Sky Person
te	particle used in full names
telem	cord
tengfya	as (= same way as)
tengkr	while (= same time as)
terkup	die
teswoting	grant
teya	full
teylu	beetle larva(e)
tifmetok	test
tiftang	stopping
tihawnu	protection,
tikawng	evil
tikenong	example
tikin	need
til	joint, hinge
ting	give
ting <u>mikyun</u>	listen
(usually pronounced: tim <u>mikyun</u> )	
ting <u>nari</u>	look
(usually pronounced: tin <u>nari</u> )	
tingay	truth
tiran	walk
tirea	spirit
tireafya'o	spirit path
tiraiqang	spirit animal
tirey	life
tirol	song
titxur	strength
to	than; comparative marke
tok	be at, occupy a space

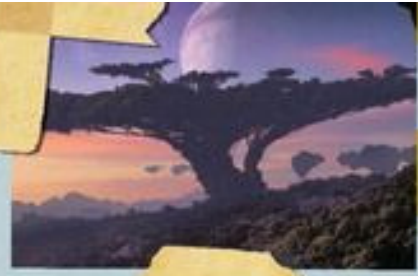
<u>sempul</u>	father
set	now
sevin	pretty
seyri	lip
<u>seze</u>	blue flower
si	do, make
si	and
sik	unquote
<u>silronsem</u>	clever (thing)
siltsan	good
ska'a	destroy
skxawng	moron
slä	but
slu	become
sngä'i	begin, start
<u>sngä'ikrr</u>	beginning, start time
<u>snumina</u>	dim (of a person)
som	hot
spe'g	capture
spe'etu	captive
<u>srak(e)</u>	marker for yes-no questions
srane	yes
sreu	dance
srung	help, assistance
steftxaw	examine
stum	almost
sutx	track, lock up
swaw	moment
swirä	creature
swizaw	arrow
swok	sacred
swotu	sacred place
syaw	call
ta	from (various uses)
ta'em	from above
täftxu	weave
<u>täftxuyu</u>	weaver
<u>takuk</u>	strike
<u>taliqang</u>	sturmbeest

<u>tok</u> tor	doctor
tokx	body
tompa	rain
<u>tor</u> uk	great leonopteryx
trr	day
tsa'u	that (thing)
<u>Tsahay</u> lu	bond (neural connection)
<u>Tsahik</u>	Tsahik, matriarch
tsakem	that (action)
tsakrr	then, at that time
tsam	war
<u>tsam</u> pongu	war party
<u>tsam</u> siyu	warrior
tsap'alute	apology
tsat	that (as object)
tsatseng	there, that place
tsatu	that person
tsawke	sun
tsawl	big (in stature)
tse'a	see (physical sense)
tseng(e)	place
tsengpe	where
tseo	art
tsing	four
<u>tsi</u> vol	thirty-two (octal: 40)
tsko	bow (weapon)
tsko swizaw	bow and arrow
tskxe	rock, stone
tskxekeng	training, exercise
tslam	understand
tsleng	false
tslolam	Got it. I understand.
tsmuk, <u>tsmuk</u> tu	sibling
tsmukan	brother
tsmuke	sister
tsni	that
tspang	kill
tsranten	matter, be of import
tsteu	brave

tsun	can, be able
tswayon	fly
tsyal	wing
tukru	spear
tul	run
tung	allow
tupe	who
tute	person
tutean	male (person)
tuteg	female (person)
txan	great (in quantity); much
txantslusam	wise, much-knowing
txe'lan	heart
txele	matter (subject)
txen	awake
txep	fire
txey	halt
txim	butt, rear end
txing	leave, abandon
txo	if
txoa	forgiveness
txokefyaw	if not, or else
txon	night
txopu	fear
txum	poison
txur	strong
ulte	and
ultxa	meeting
unil	dream
Uniltaron	Dream Hunt
uniltirantokx	avatar; dreamwalker body
uniltiranyu	dreamwalker
utral	tree
Utral Aymokriyā	Tree of Voices
virā	spread, proliferate
virā	spread, proliferate
vofu	sixteen

# FOR INTERNAL USE ONLY

Field notes and other data from the Resources Development Administration's xenobiological research and scientific labs have been compiled as a guide to the many unique aspects of the moon Pandora. This report details Pandora's alien ecosystem; its mining mother lode and topography; its flora and fauna; and the culture, language, and physiology of the native population, the aggressive hunter-gatherer race called the Na'vi. Exceedingly profitable, Pandora provides challenges to successful exploration and extraction. From its gravity-defying Hallelujah Mountains to its gargantuan natural Stone Arches, and from the small but venomous hellfire wasp to the gigantic carnivorous thanator, Pandora poses continual dangers to RDA aerial- and ground-forces daily. Also included in this manual are highly confidential and detailed descriptions of RDA technology and weapons systems deployed to suppress the indigenous hostiles and defend employees against the dangerous Pandoran environment.



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