

Ai intelligent industrial design of Titan space probe (landing capsule and Saturn vehicle)

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Abstract. Exploring the solar system is of great significance for the realization of the community of human destiny. This article reviews the history of Saturn exploration and explores new directions in design aesthetics. The author designed a new type of Saturn's sixth satellite (Titan) with three-dimensional software 3dsmax, including a landing capsule, a cruise vehicle (Saturn vehicle), involving the design of quantum communication, automatic driving, neural chain Ai chips, mechanical arms, etc. "Lack of beauty and tediousness", pursue "characteristics, cultural innovation". The new detector, with exquisite shapes and beautiful lines, combines the eastern cultural symbols of "Zhouyi and Dunhuang Feitian", and uses memory metal and three-dimensional printing to manufacture, expanding the new Higgs boson, neutrino, and non-carbon-based life Explore the field, named "Hetu Jishu", which closely combines mechanical aesthetics and the Silk Road.

1 Development history of industrial design of the Saturn (satellite) probe

1.1. Exploring Saturn, the dream begins

The sky is vast, the exploration is endless, and the gas giant planet Saturn is explored. From the 1970s, the "Pioneer-11, Voyager-2, Cassini-Huygens" probes were launched toward Saturn and flew over Jupiter, Uranus, Neptune. In 2004, the "Huygens-Landing Module" escaped from the "Cassini-orbiting spacecraft" and reached 1,270 kilometers above the sixth satellite of Saturn, crossing the atmosphere and successfully landing softly.

1.2. New space probes to expand the future space for human beings

A great cause begins with dreams, and dreams are a source of vitality. From 2020 to 2030, mankind will implement 16 space missions of solar system planets (satellites), including China-Mars exploration, Tiangong space station, Europe-landing moon, Japan-asteroid sampling and return. The past honest detectors have the same appearance, clumsy and mediocre shape, and have nothing to do with the aesthetic hall [1]. The new type of detector uses aesthetics to express the mechanical structure, integrates culture, and displays the smart industrial design beauty. Exploring the vast universe is a relentless pursuit of humankind, and aerospace must reflect the colorful local cultural characteristics of different countries. The author combines ancient art (paper-cuts, shadow puppets, murals) and aerospace. "Aerospace Dream" won the 2018 "China© First Illustration Painting Exhibition" (Figure 1), and was selected as the sixth China Youth Art Exhibition, The 13th China Art Exhibition.



Figure 1. The author©painting "Flying into Space-My Space Dream" carries the dream.

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2. The new detector consists of a relay satellite, a landing capsule, and a cruise vehicle (Saturn car)

2.1. Titan's geological environment looks like early Earth

Saturn's largest satellite has a thick atmosphere, with land, lakes, mountains and plants, much like the Earth 100 million years ago, and it has the same environment as Jupiter's second satellite (the world's oceans under the thick ice). Are satellites with unique geological structures, which are of great significance for studying the solar system.

2.2. Achieving the three goals of "surround, landing, and cruising"

French designer Dassault once said: Only beautiful aircraft can be good aircrafts [2]. "Titan New Detector" is a huge mechanical body composed of many parts, including relay satellites, landing capsules and Saturn vehicles (Figure 2). It is 10 meters long and 5 meters wide and weighs 10.81 tons after fueling. It used an ion thruster to fly, and was captured by Saturn's gravity after six years. The relay satellite separated from the landing capsule and surrounded Titan to serve as a communication relay station. The landing capsule entered the atmosphere, landed softly on the ground, and released the Saturn rover to begin global observations. Due to the atmosphere, the landing module can be decelerated with three parachutes, while the variable thrust assist engine

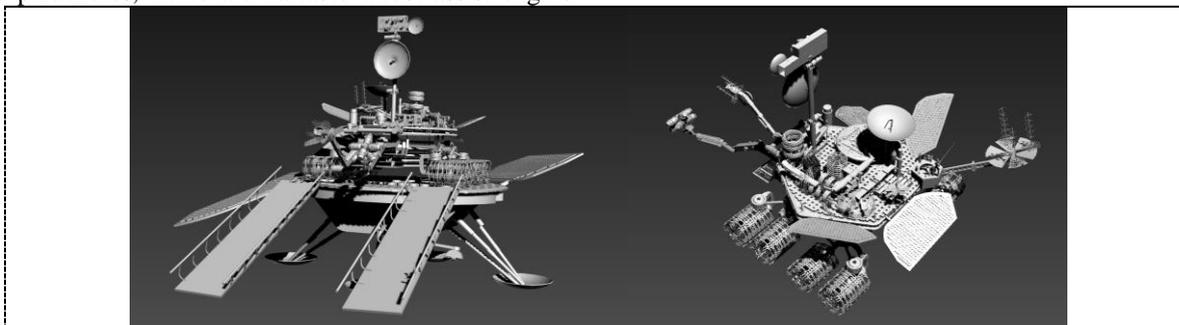


Figure 2. "Hetu Jishu" probe landing module and Saturn vehicle (3dsmax modeling effect).

3. Saturn vehicle is a combination of artistic appearance and technical rationality

3.1. Design of "vibration reduction platform" mimicking biology, rigid body dynamic aesthetics

The central support platform draws on the crawling posture of the natural creature "turtle" and designs three "vibration-absorbing matrix platforms" based on the principle of biological imitation. The air cylinder controls

(9190 N) is used to adjust the power to complete the "correction, braking, and descent" control. At 108 meters above the ground, hover in the air, the radar scans the surface, pans, avoids large pits and obstacles, looks for new landing points, and does not land until the safe area. The Saturn weighs 3.22 tons. It follows the mechanical slide and slowly moves from the landing platform to the ground and begins cruising.

2.3. Quantum communication embodies the ultimate manual mechanical aesthetics

There are 7 types of landing capsules and 9 scientific instruments on Saturn, which can accurately collect data. Seismometer—measure core thickness, mantle density and crustal structure, fluid dynamics instrument—drill 3.8 meters below the soil, measure internal temperature, judge core is solid (liquid), three-dimensional structure and dynamic measuring instrument—measure magnetic field, carbon Analytical laboratory—detection of surface mineral composition and geological history, monitoring of spontaneous decay of water atom protons, AA atmospheric analyzer—study of the atmosphere (clouds, haze), biological experiment chamber—detection of signs of methane microorganisms, Higgs boson-dion detector— Detecting the space distortion caused by Saturn's huge gravitational force, and judging the existence of long fiber structure dark matter (dark matter hair), Hyper-mini detector) —observing the "neutrino beam" of the sun and supernova, QC quantum communication—testing entangled transmission at long distances .

the spring to move up and down, compensates the vibration frequency, avoids obstacles flexibly, and effectively crosses bumpy stones and puddles. Made of memory metal, capable of bending and torque, intelligent skinning in a short time, self-healing, maintaining geometry, maintaining high strength support, resisting fatigue, and maintaining traction when passing through soft sand and hard rocks.

3.2. Power traction design (drive) embodies the process aesthetics of manufacturing technology

The surface temperature of Titan is minus 179.2 degrees Celsius, methane liquefies to form clouds, rises to high

altitude and turns into rain and snow, and then falls to the ground, filling the surface depressions and craters, making the surface of the planet smooth. Methane rain forms a lake with a maximum area of 400,000 square kilometers, and waves and tides are very weak, less than a dozen centimeters. Saturn requires the ground contact area of eight wheels to increase friction to prevent skids and runaways. The wheels wear while driving, and are corroded and burned by the surface methane. The connecting rods and gears show a mottled gloss.

3.3. Honeycomb mesh section wheel, seamless casting using 3D printing technology

Wheels are cast using 3D printing (metal printing,

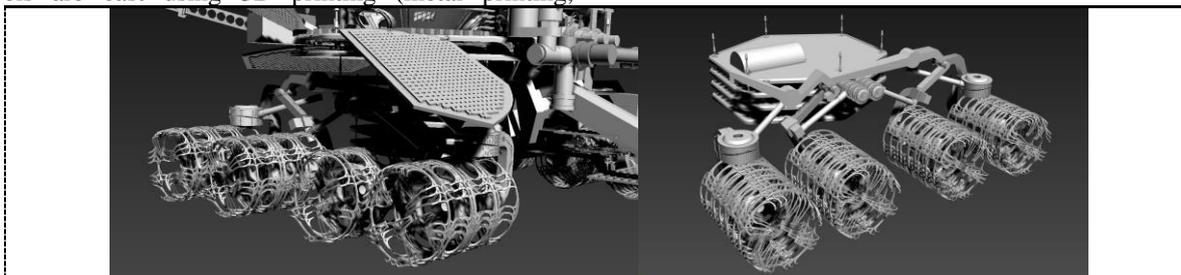


Figure 3. Wheel with honeycomb mesh design (3dsmax modeling effect diagram).

3.4. Design of solar, isotope thermal energy generator and graphene hybrid battery

Too far from the sun, the solar power generation efficiency is low, and sand storms and rain and snow will also cover up the solar panels. Therefore, it is also equipped with isotope heat generators and graphene batteries. The generator is a plutonium-238 circular device, separated by a green barrier to prevent radiation, zero radiation, zero pollution, using the "West Baker effect" to release neutrons and heat, which converts heat into electricity and provides 618 watts of power. At minus 179.2 degrees Celsius, the battery can provide enough heat to ensure that the scientific instrument "wraps in sleep", is not frozen and can wake up on its own.

4. Aerospace design is no longer a simple imagination, but a smart, stylish art symbol

4.1. Manual installation of "quantum communication", the ultimate in mechanical aesthetics

In addition to the traditional wireless microwave, the detector also has quantum communication. The "quantum entanglement-secret key" communication device consists of 3081 parts, 24 pairs of gears, and realizes laser "invisible transmission" in an 8.1cm radius interferometer. It is a spiral mechanical structure surrounding a cylinder

vacuum cold welding). The wheels have a diameter of 58cm, a width of 81cm, a weight of 1919 grams, an independent motor drive, can climb 45-degree slopes, and a speed of 81 meters per hour. It does not use a traditional blade-like design, but uses a honeycomb stacked mesh surface (claw layer) design (Figure 3), because the soil on the planet's surface is very different from the inner particles, and large stones are deposited inward by gravity, and the ground is covered by After the car is pressed, an indentation will be formed, and the powder soil will fall into the gap, exposing a thicker bulky gravel-pointed stone, which will jam the blade-like wheels, and the honeycomb wheels have good elasticity, discharge sludge, and will not slip and sink.

and other scientific instruments. Echoing each other, the shape is beautiful and integrated. "Quantum invisible teleportation, high-speed interference of satellite-ground laser communication" is an open umbrella shape, simple and elegant. Engineers manually installed 919 optical components to the "long-distance quantum entanglement distribution antenna". The huge workload and micron precision are the ultimate embodiment of mechanical aesthetics.

4.2. Lonely Explorer, Aesthetic Design of 3D Four-Dimensional Robotic Arm

Saturn's exquisite car manufacturing technology is reflected in the design of the pivot and most of the "3D four-dimensional robotic arm" (Figure 4). It consists of two brackets with a length of 1.6 meters. On the neck and head of the five-mast mast, navigation cameras and chemical spectrometers are installed (to induce the laser to irradiate and evaporate a portion of the rocks and soil to obtain samples). Terminal instruments also include: drilling machines, rock brushes, holographic cameras, alpha particle X-ray spectrometers.

4.3. Titan's intelligent brain- neural chain Ai chip and autonomous driving computer

The "relay communication satellite" staying in orbit transfers surface data for the traveling "Saturn vehicle" for sharing and collaboration. Because driving in a harsh environment for a long time, the hardware is easy to age, and a backup computer is needed [3]. It uses a high-density neural chain stereo chip, eliminating a large

number of cables, thereby reducing the volume occupied by the control machinery. Its brain is a computer composed of a neural chain Ai chip and a big data sharing network, a 3D holographic camera and a structured wall panel conductor all over the body. It uses fiber optics to densely connect all terminal equipment, all

around the landing capsule and Saturn (Figure 5) With primary self-awareness and logical thinking, using rare metals such as "rhenium, iridium, lanthanum, osmium" and "silicon-graphene-germanium" composite materials for autonomous driving.

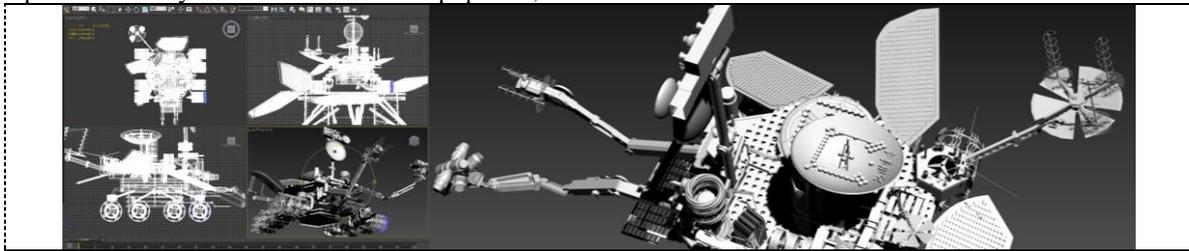
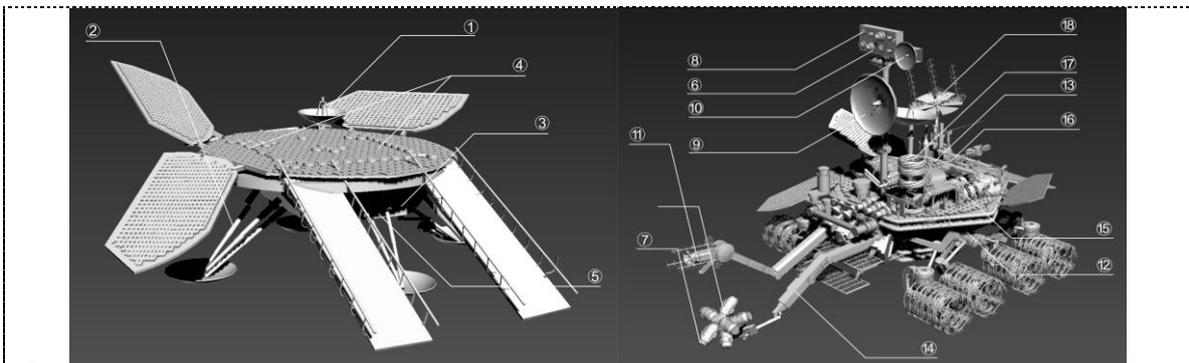


Figure 4. 3D four-dimensional robotic arm and design (3dsmax modeling effect diagram)



- ① AA atmospheric analyzer. Atmosphere (cloud, haze), temperature, humidity, air pressure, ultraviolet radiation.
- ② BFF landing buffer fixing bracket. Elastic rigid body support.
- ③ Higgs boson-dion detector. The degree of space distortion in the gravitational environment around Saturn.
- ④ Irregular solar panels.
- ⑤ Hyper-mini detector. Detect neutrinos.
- ⑥ SHC holographic stereo matrix camera. 3 sets (180 million pixels / set) of color and infrared camera arrays.
- ⑦ PP magnifier. At a 1.6-meter mechanical long-arm end, viewed at close range, the resolution is 28 microns.
- ⑧ SC high speed camera. Assist earth control personnel to understand the environment within 226 meters.
- ⑨ JL creatures. Detect methane organisms, organic compounds (hydrogen, oxygen, nitrogen), non-carbon based life.
- ⑩ X-Ray M / C carbon element analyzer. X-ray irradiation to identify crystals.
- ⑪ LA high power laser gun. Locally gasify ore 10 meters away and analyze its chemical composition.
- ⑫ GPR geodesic radar. Detects 38-meter-thick soil structures and scans three-dimensionally at a depth of 240 meters.
- ⑬ Wcom fluid dynamics instrument. Detects the chemical composition of surface methane water molecules.
- ⑭ 3D four-dimensional robot arm. Collect ore and soil samples and send them to the on-board laboratory.
- ⑮ Mnb isotope temperature difference generator, graphene battery.
- ⑯ Neural chain Ai chip quantum computer. Logical thinking (consciousness), cloud computing, autonomous driving.
- ⑰ MFS three-dimensional structure and dynamic magnetic field measuring instrument.
- ⑱ QC quantum communication. Quantum entanglement distribution, secret keys, teleportation.

Figure 5. Structural design of landing capsule and cruise vehicle (Saturn vehicle)

5. Enlightenment of future spaceflight

The Titan detector does not have an icy mechanical structure, but fully absorbs the cultural symbols of the "Dunhuang Flying Sky" in the east (Figure 6), and uses the ancient wisdom philosophy of "Hetu Jishu-Zhou Yi" (Figure 7) to carry out preliminary ideas. The final design of the aerospace product integrating aesthetics, technology and Ai intelligence was designed, showing beautiful lines and exquisite mechanical aesthetics. It is a

whole, echoing each other, elegant and concise, exudes dynamic vitality. It is predicted that in the future, it will be invisible (holographic laser stereoscopic display), it will have a magnetic sail engine, the spacecraft will surf in the magnetic field around the planet, change the orbit through the interaction of the magnetic field, use nuclear impulse acceleration, and the laser will propel the light sail. Bending time and space to achieve the speed of light, a single silicon wafer is used to produce highly integrated tiny satellites, which form a mirror with a diameter of several kilometers to illuminate the back of the earth. To explore the universe, only by cooperating with

international space and focusing on the wisdom of all mankind, can we create a better future.



Figure 6. The author©painting "Dunhuang Feitian" mural and hand-carved, applied in design.

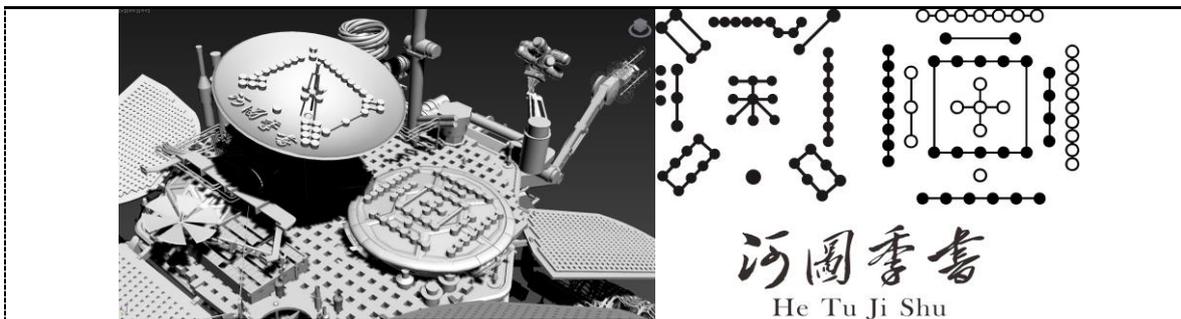


Figure 7. Use the "Hetu Jishu-Zhou Yi" philosophy to carry out early creative ideas.

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