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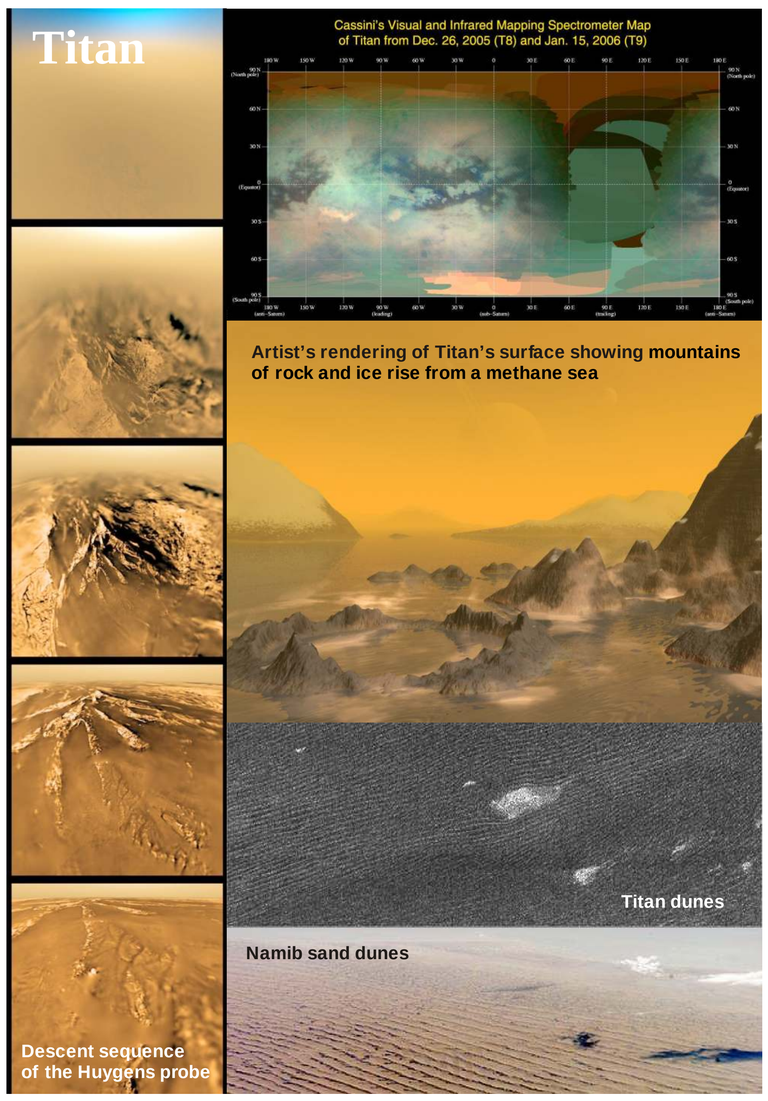
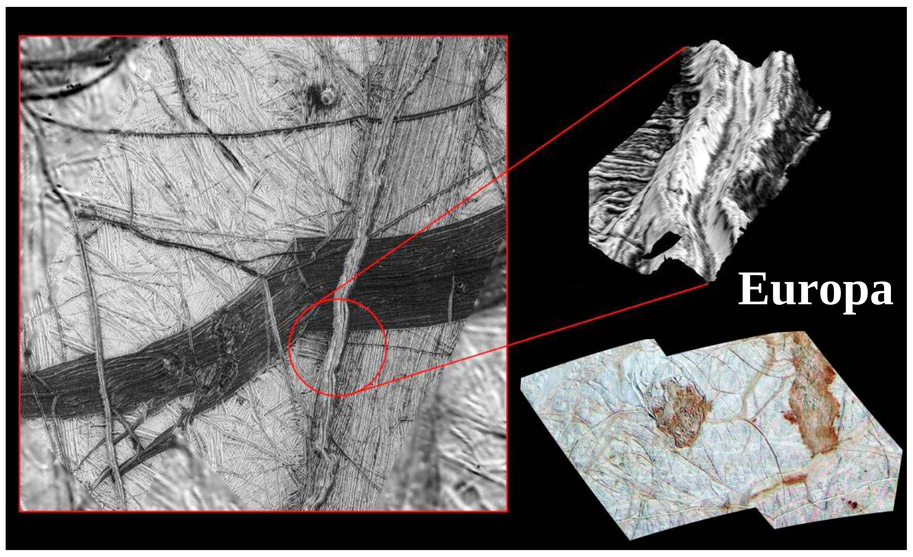
# Distant Worlds - Strange Skies

Compiled by U. Schreiber

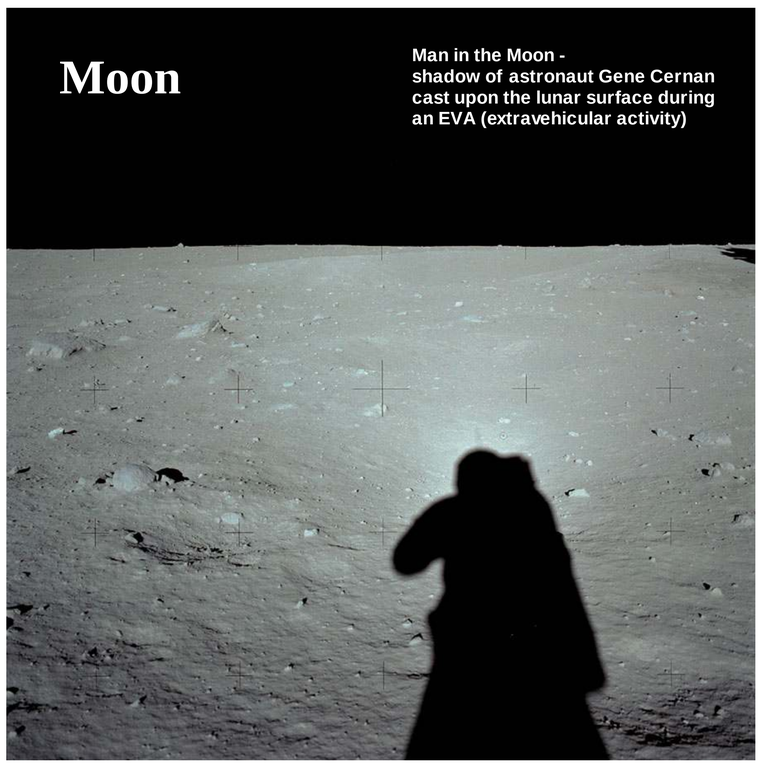
**To conquer distant worlds has long been the dream of Mankind... but apart from a few brief sorties to the Moon almost 40 years ago it has remained just that. On the other hand unmanned robotic probes sent off to more or less far off destinations, such as Mars, Titan, Mercury and the moons of Jupiter have gathered an enormous amount of information about conditions in these places, providing the data necessary for the next step, i.e. launching humans on their greatest adventure of discovery yet.**

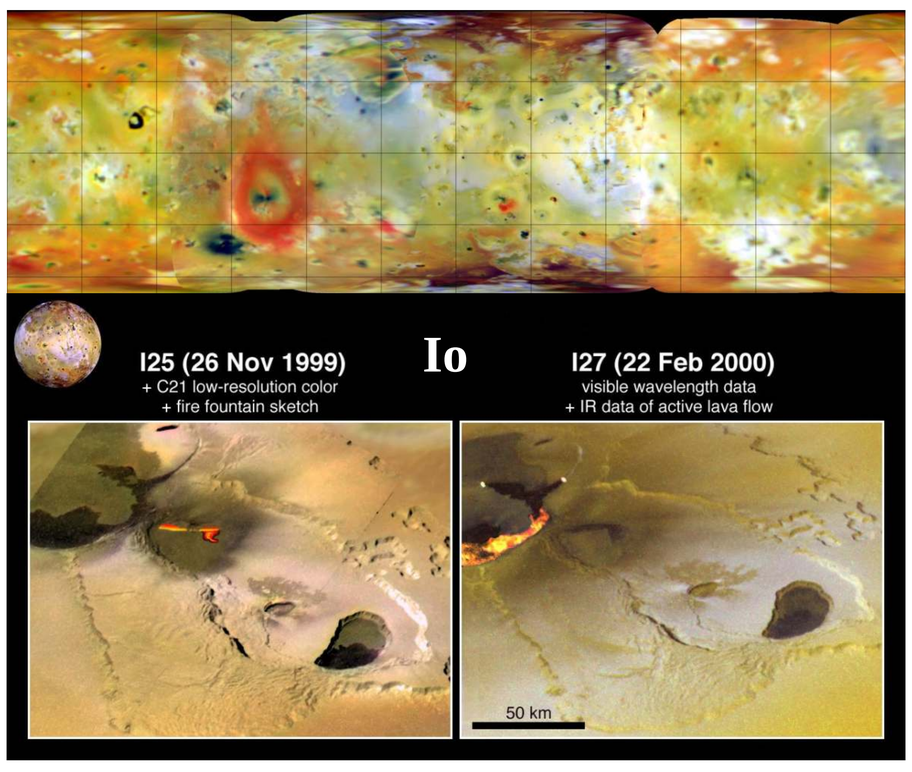



Like Earth Saturn's largest moon ***Titan*** has a nitrogen-based atmosphere, cloaking it in a thick orange haze. Instead of Earth's free oxygen, however, it contains complex hydrocarbons, such as methane, ethane and acetylene... an unbreathable mixture for humans. And while temperatures on Titan, rarely rise above minus 180°C - its distance from the Sun being nearly ten times that of Earth - the vast amount of images and data acquired by the *Cassini-Huygens* mission have revealed surprising similarities in respect to landforms(left).

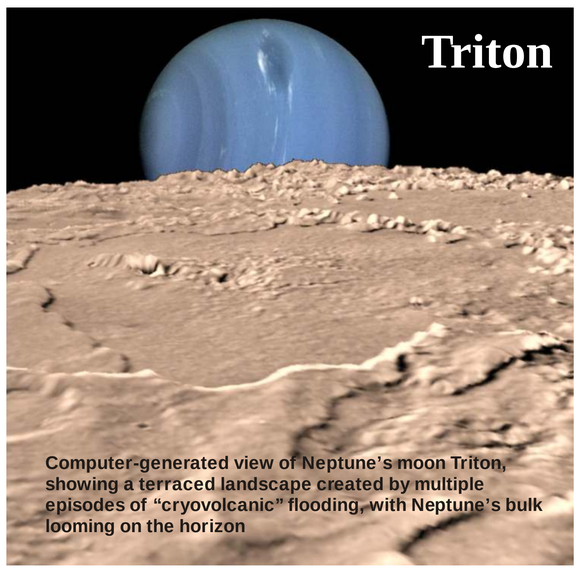


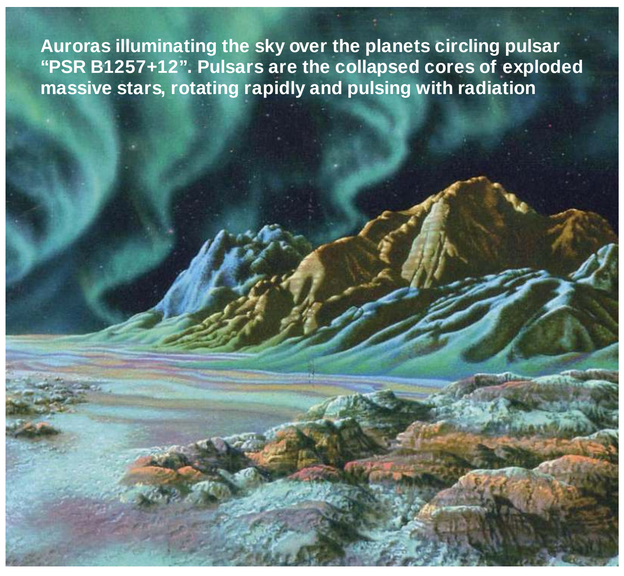

Jupiter's icy moon ***Europa*** shows a great variety of "landforms" including ridges, fractures and wedge-shaped bands (above), documenting both internal and external geologic processes, while apparently "rafted" crustal blocks, combined with the presence of a magnetic field, point to the existence of a subsurface ocean of liquid water, which might harbour life. Violent volcanic eruptions constantly change the surface of another of Jupiter's large moons, ***Io***, covering it with sulphur-rich deposits (below). Before their discovery by the *Voyager* mission, Earth had been the only known place in the solar system, where active geologic processes occur, making these two Jovian satellites with their unique features prime targets for research by planetary scientists. In addition to the *Voyager* images, the more recent *Galileo* mission provided a host of data regarding conditions on the surfaces of ***Europa*** and ***Io***.



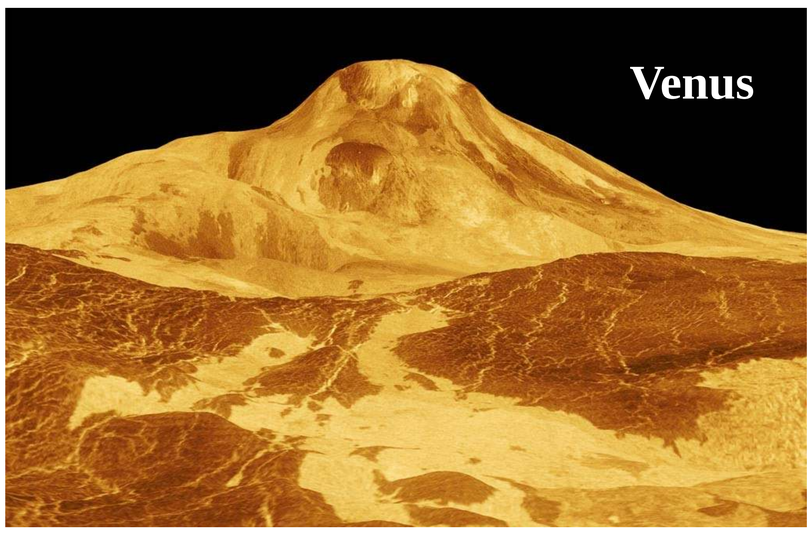

Although a mere 400,000 km distant, Earth's ***Moon*** has little in common with its parent planet. The only extraterrestrial body upon which humans have set foot to this date is a rocky desert in greyshades. Without an atmosphere it is exposed to the Sun's hard radiation, meteorite impacts and great daily temperature fluctuations, its "sky" the blackness of space. Yet a permanent moon base has been envisaged not only by science fiction writers, but is considered a feasible proposition both with a view to investigating the Moon's natural resources, and as a launching facility for Mankind's eventual expansion into space.



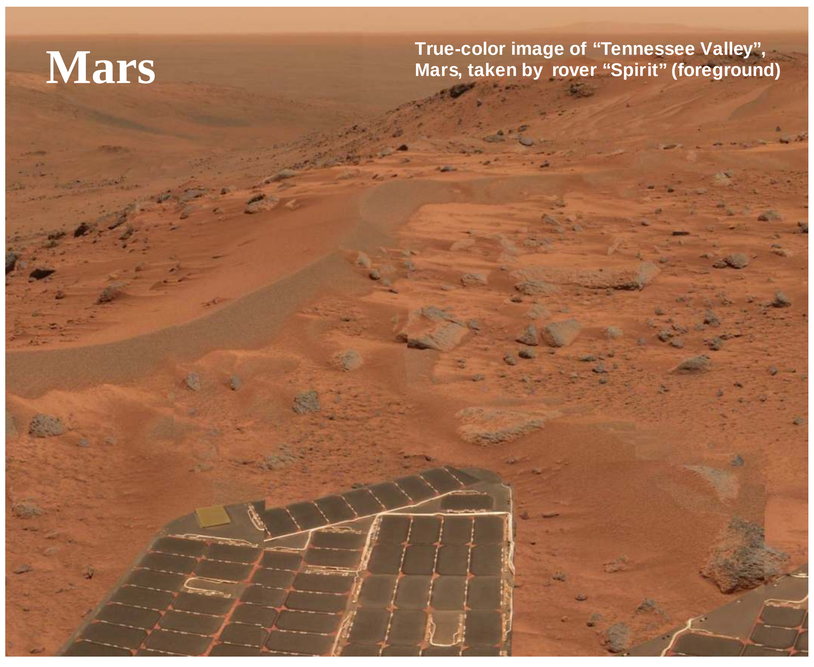






Apart from the planets of our own solar system there are millions of worlds orbiting other stars throughout the universe, some of which might be bearing life. Astronomers so far have discovered some 150 ***"extrasolar" planets*** (although most have not been directly observed, but their presence deduced from orbital inconsistencies, or "wobbling", of their home star), and from the available data envisioned possible scenarios as they might exist on such distant worlds. A potentially habitable planet with Earth-like temperatures, which would permit the existence of liquid water, was recently discovered some 20 light-years away in the constellation Libra. Five times the size of Earth, it orbits a dim red "dead" star about one hundredth as luminous as the Sun at a distance of only 11 million kilometres... adding further proof that planetary systems may exist around a wide variety of star types.




Due to its dense atmosphere and extremes of temperature and pressure, few images are available from the surface of ***Venus***. However, 98% of the planet have been radar-mapped by the *Magellan* mission, allowing planetary geologists to develop computer simulations by combining data from various surveys. Extensive lava flows surrounding volcanic cones like the 8 km-high Maat Mons (above), and broken by occasional impact craters, appear to be the main surface features, yet no signs of geological activity have so far been observed.




In contrast to Venus, ***Mars*** is a cold little world, a desert of reddish rock and dust, spanned by a pinkish sky. Only about one third the size of Earth, its thin atmosphere is incapable of retaining the Sun's heat during the night, causing enormous daily temperature variations. Nevertheless, scientists class it as a potentially habitable planet, and the existence of huge canyon systems and layered rocks indicate that it must once have contained flowing water, which today is locked up in the polar caps and a thick permafrost layer beneath the surface.