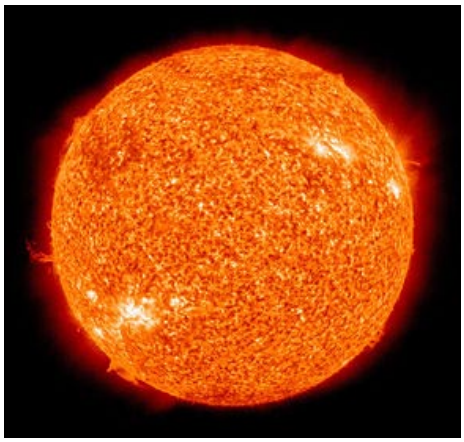
2315 – THE JOVIAN UPRISING

Locations / players

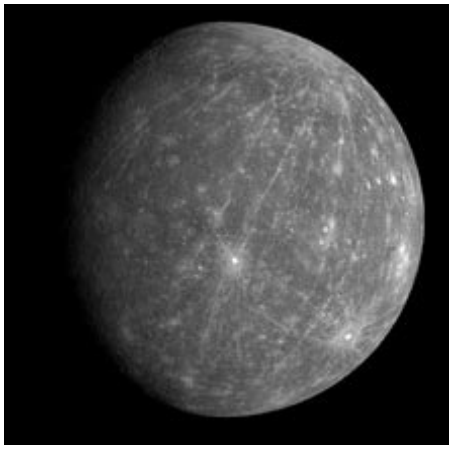


Sun: G2V main sequence star. Surface temperature of 5778 K. Distance from Earth is 149.6 million km (1 AU), or 8 minutes and 19 seconds at the speed of light. Solar region controlled by the Terran Federation.

Diameter: 1,392,000 km

Orbital installations: Six unmanned Sun observations satellites.

Mercury: First planet of the Solar System. Under control of the Terran Federation, with status of colony. Capital: Mercury Prime. Governor: **Garth Saxman** (57 y.o., widowed, 4 children).



Distance to Sun: 0.307 – 0.466 AU.

Diameter: 4879 km.

Local gravity: 3.7 m/s2. Density of 5.427. Large iron core with rock mantle.

Orbit / rotation: Orbital period of 87.97 days, inclination of 7.0 degrees. Rotation in 58.64 days (3 rotations per 2 orbits).

Atmosphere: Trace atmosphere of O2, sodium, hydrogen, helium.

Surface temperatures: 80 – 700 K.

Moons: None.

Surface / orbital installations: Manned Sun observatory near South Pole. Seven separate underground mining complexes for metal extraction (chrome, nickel, iridium,

platinum, titanium, copper, gold, uranium). One small miners' town and spaceport (Mercury Prime, near North Pole, pop: 78,000). Constellation of navigation and communications satellites (heavily shielded) in orbit. Total population of 153,000.

Venus : Second planet of the Solar System. Under control of the Terran Federation but left unoccupied due to hellish conditions on the planet.

Distance to Sun: 0.718 – 0.728 AU.

Diameter: 12,103 km.

Local gravity: 8.87 m/s2 (0.9 G). Density of 5.2. No tectonic activity, weak magnetic field.

Orbit / rotation: Orbital period of 224.7 days, inclination of 3.39 degrees. Rotates in 243 days.

Atmosphere : Extremely dense, 250 km-thick atmosphere of mostly CO2, with some nitrogen and sulphur dioxide. Surface pressure of 92 bars. Thick high altitude clouds of sulphur dioxide and sulphuric acid droplets (between 50 – 80 km altitude). 300 km/h winds at altitude. Pressure of one bar and temp of 75 C at altitude of 50 km, where layer of sulphuric acid haze starts down.

Surface temperatures: 735 K.

Moons: None.

Surface / orbital installations: No surface installations due to hellish conditions on the planet. Past attempts at terraforming failed due to systemic corrosion and breakdown of

terraforming equipment. Small constellation of astronomical observation and communications relay satellites in orbit.

Earth : Third planet of the Solar System. Home world of Humanity. Seat of the Terran Federation. Capital: Shanghai. Head of government is Grand Administrator **John Li** (56 y.o., married, 2 children), who thinks the needs of the masses on Earth are more important than the individual rights of the Spacers, whom he considers 'spoiled elitists'. Li is resolved in squeezing more out of the Spacers for the benefit of Earth citizens.

Distance to Sun: 0.98 1.01 AU.

Diameter: 12,742 km (mean).

Local gravity: 9.78 m/s2 (1 G). Density of 5.51.

Orbit / rotation: Orbital period of 365.25 days. Inclination of 7.15 degrees.

Atmosphere: Nitrogen (78%) and oxygen (21%) atmosphere. Ground pressure of one bar (101 KPa).

Surface temperatures: 184 – 331 K.

Moons: One moon.

- **Moon:** Colony of the Terran Federation. Governor: **Elsie Madambo** (50 y.0., married, 3 children).

  Diameter: 3475 km.

  Local gravity: 1.62 m/s2 (0.165 G). Density of 3.34.

  Orbit / rotation: Orbital period of 27 days, 7 hr and 44 min.

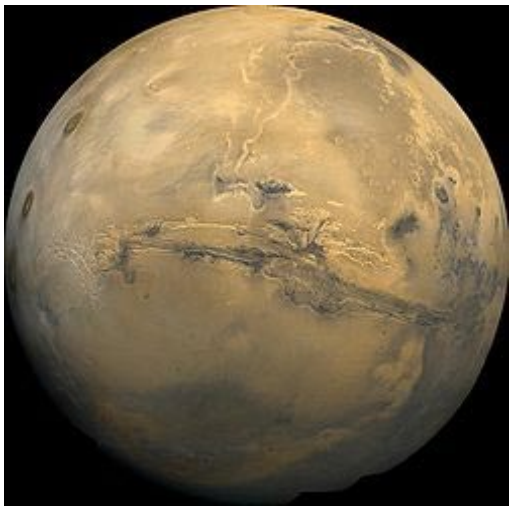
  Atmosphere: None.

  Surface temperatures: 70 – 390 K.

Surface / orbital installations: Major underground shipyard and spaceport near South Pole (Selene, pop: 408,000). Three underground mining complexes (aluminum, titanium, iron, concrete). Constellation of navigation/communications relay satellites in orbit. Famous EARTH WATCHERS luxury hotel complex on visible side of the Moon.

Surface / orbital installations: Earth is home in 2315 to 8.2 billion humans on the surface, plus 92 million more humans in 136 major orbital installations. Thousands of artificial satellites and minor stations circle the planet (including 26 heavy orbital defence fortresses). Most of Earth's natural resources and mineral ore have however been expended and the planet depends heavily on space resources.

Mars : Fourth planet of the Solar System. Semi-autonomus colony of the Terran Federation. Capital: Ares City (in Valles Marineris). Governor: **Charles Watts** (62 y.o., married, 3 children, born on Mars). Watts is growing tired of the incessant demands from Earth for more of its resources while raising taxes constantly.



Distance to Sun: 1.38 – 1.66 AU.

Diameter: 6792 km.

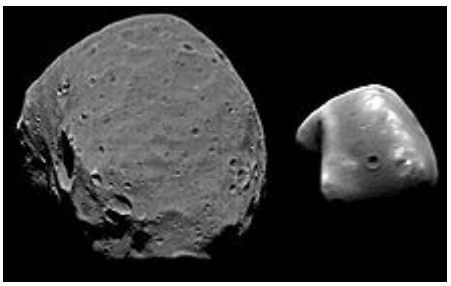
Local gravity: 3.711 m/s2 (0.376 G). Density of 3.93. Dry surface, with water in underground permafrost and ice at the poles.

Orbit / rotation: Orbital period of 686.97 days. Rotation in 24.62 hr. Inclination of 1.8 degrees.

Atmosphere: Thin (0.636 KPa) atmosphere of CO2 (95.3%), nitrogen (2.7%), argon (1.6%) and oxygen (0.13%). Violent winds create huge sand storms.

Surface temperatures: 186 – 293 K.

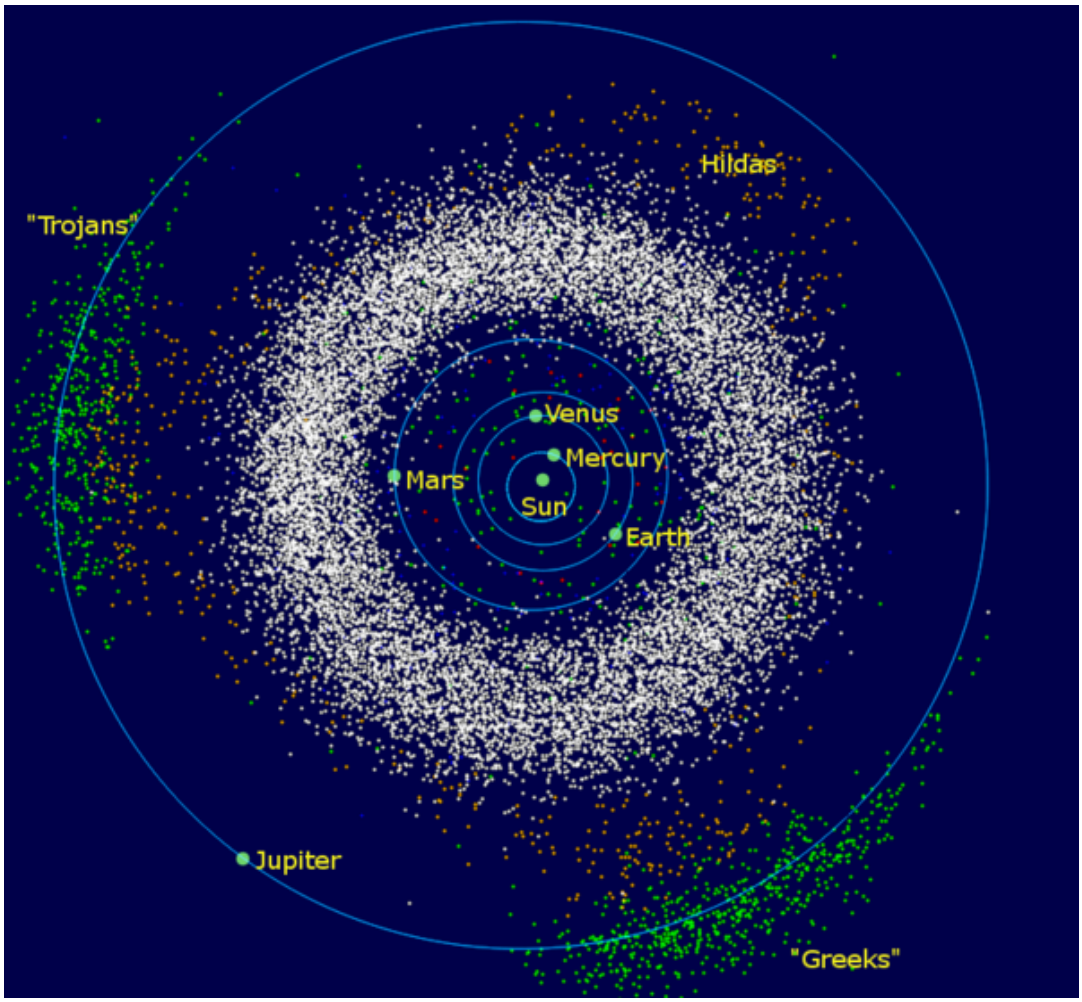
Moons: Irregularly shaped captured asteroids of **Phobos** (22.2 km dia) and **Deimos** (12.6 km dia). They only shelter communications relay and navigation stations.



Phobos (left), Deimos (right)

Surface / orbital installations: Thirty-nine major cities (mostly underground), including the capital, Ares City (pop: 1,840,000). Total Mars population: 186,290,000. Major shipyard and mining industries. Biggest producer of steel, magnesium, aluminum and titanium in the Solar System. Significant tourism industry as well. Ongoing efforts to terraform the planet, but process will take centuries. Six manned orbital installations, including two tourism centers, plus constellations of total of 74 various types of satellites.

Main Asteroid Belt: Theoretically a territory of the Terran Federation, but ownership is in increasing dispute, with myriad of private corporations having built space installations and surface facilities all over the Belt. Main population center is Ceres, which is controlled by a semi-autonomous corporate entity, the Ceres Consortium. Some Terran installations exist in the Belt, which only exacerbates the territorial disputes. The Main Asteroid Belt and the other asteroid groups are the refuge/home of choice to those who resent/try to escape Terran Federation authorities.

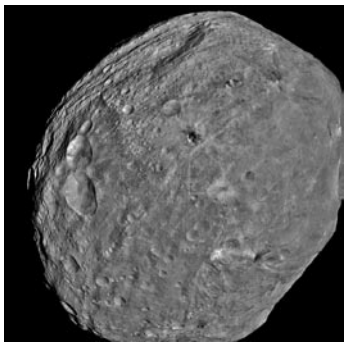


Distance to Sun: 2.8 AU (center of mass). Outer boundary at 3.2 AU, inner boundary at 2.06 AU. The Trojans follow Jupiter's orbit at 5.2 AU (center of mass).

Diameter: Varies from dust particle to large asteroids and one dwarf planet. The Main Asteroid Belt contains over a million asteroids with a diameter of one km or more. Over 200 asteroids have diameters of 100 km or more. The Trojans/Greeks Asteroids account for as many asteroids as the Main Belt.

Surface / orbital installations: Over 170 separate private consortiums/corporations operate more than 6,800 various installations/facilities throughout the Main Belt and the Trojans, Greeks and Hildas asteroids, most geared towards asteroid mining or space structures/ships construction. Total population of the Main Belt and asteroid groups is presently uncertain, with many corporations deliberately understating their population for tax purposes, but is estimated at about 64 million people. In reality, the total population in 2315 stands at 87,790,000 people.

4 Vesta: Large asteroid. Property of the Vesta Consortium. CEO of Vesta Consortium is **Karl Langemann** (56 y.o., married, 2 children), a fiercely competitive and independent-minded businessman.



Distance to Sun: 2.15 – 2.57 AU.

Diameter: Irregular shape, 578 km x 560 km x 458 km.

Local gravity: Density of 3.42, gravity of 0.22 m/s2. Iron-nickel metallic core covered by rocky mantle.

Orbit / rotation: Orbital period of 1325 days, inclination of 7.13 degrees.

Atmosphere: None.

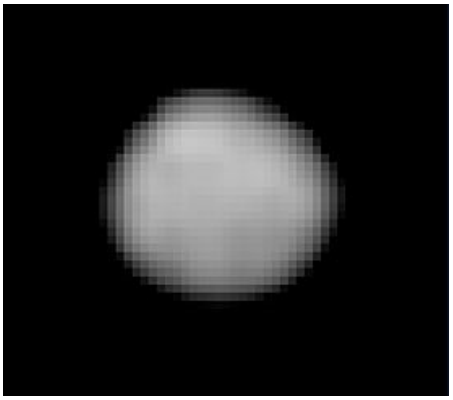
Surface temperatures: 85 – 255 K.

Moons: None.

Surface / orbital installations: Underground city and building complex of Kirkland (official population: 397,000. Real population: 561,000). Four underground smelting and metal works centers. One underground production center for prefab concrete structures. One main spaceport (Kirkland). Vesta is hub center for total of 46 separate asteroid mining operations. Total population of 2.85 million.

2 Pallas: Large asteroid. Property of the Pallas Mining Industries. CEO of PMI is **Jacobus Stein** (69 y.o., married, 6 children), a brilliant metallurgical engineer and businessman. Stein is a secret business partner of Nadia Suslov.

Distance to Sun: 2.13 – 3.41 AU.



Diameter: Irregular shape. 582 km x 556 km x 500 km.

Local gravity: Density of 2.8, gravity of 0.18 m/s2. S-type asteroid made of silicate rock.

Orbit / rotation: Orbital period of 1686 days. Inclination of 34.84 degrees.

Atmosphere: None.

Surface temperatures: 164 – 265 K.

Moons: None.

Surface / orbital installations: Underground city/smelting/metal works center of Pallas Prime (population: 1,234,000 (official) / 1,315,000 (actual). Specializes in production of high-grade metal products/parts. Reputed as best producer of machine tools and precision parts in the Solar System. Controls a total of 23 separate asteroid mining operations. Spaceport of Pallas Prime. Clandestine (and illegal) production of weapons for personnel and ships. Total population of 3.16 million.

10 Hygiea: Large asteroid. Controlled by the Sverdlovsk Group. CEO of Sverdlovsk Group is **Nadia Suslov** (45 y.o., divorced, 1 child), a very intelligent but ruthless woman. Suslov is a firm believer in 'free enterprise', including quasi-criminal or squarely illegal activities.

Distance to Sun: 2.77 – 3.51 AU.

Diameter: Irregular shape. 530 km x 407 km x 370 km.

Local gravity: Density of 2.12, gravity of 0.091 m/s2. C-type asteroid, carbonaceous rock.

Orbit / rotation: Orbital period of 2031 days. Inclination of 3.84 degrees.

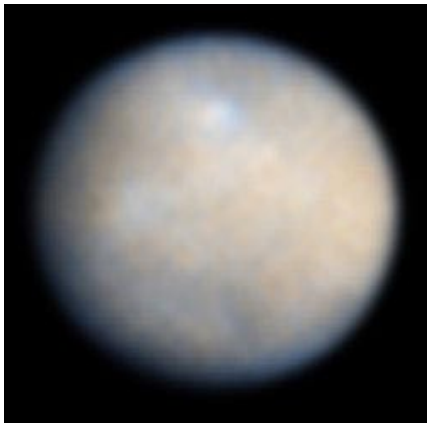
Atmosphere: None.

Surface temperatures: 164 – 247 K.

Moons: None.

Surface / orbital installations. Underground city and spaceport of Vostok (population: 142,000 (official) / 253,000 (actual)). Has some mining, smelting and manufacturing industries but specializes mostly in human service industries (including sex trade and gambling). Vostok has a reputation as being the 'Sodom and Gomorrah' of the Belt. The Sverdlosk Group controls 17 separate asteroid mining operations and 14 other space installations, including the infamous 'Zero-G Nirvana', a deep-space brothel. Total population of 1.39 million.

Ceres : Dwarf planet part of the Main Asteroid Belt. Controled by the Ceres Consortium. CEO of Ceres Consortium is **Shinjo Suzuki** (73 y.0., married, 5 children), an expert agronomist turned businessman and administrator. Suzuki firmly believes that the future of Humanity is in space, not on old, polluted and depleted Earth. As such, the growing demands of the Terran Federation are becoming more and more intolerable to him.

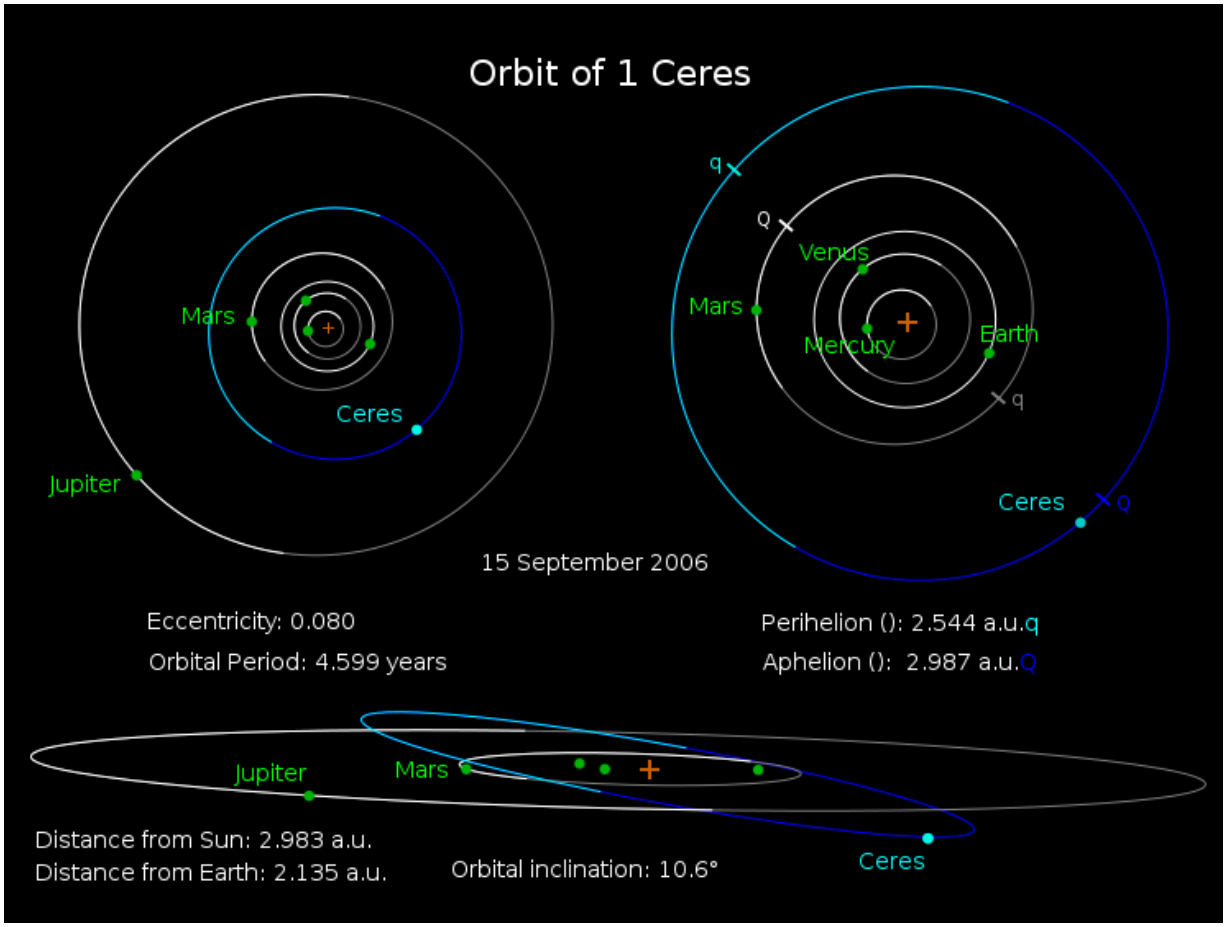


Distance to Sun: 2.54 – 2.98 AU

Diameter: 950 km

Local gravity: 0.27 m/s2. Density of 2.077. Water ice mantle and dusty crust over rocky core. Has more water in its mantle than Earth has in its oceans.

Orbit / rotation: Orbital period of 1680.5 days. Inclination of 10.58 degrees.



Atmosphere: None.

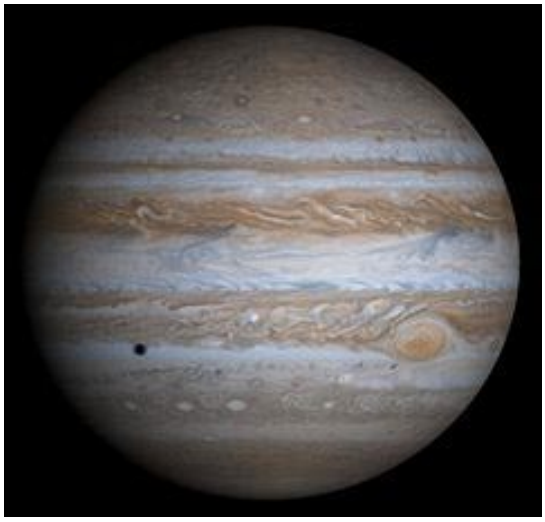
Surface temperatures: 167K (mean).

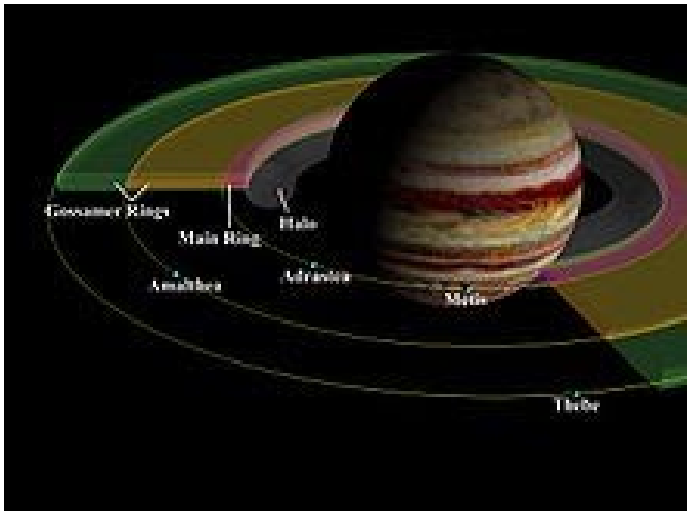
Moons: None, but surrounded by various objects of Asteroids Belt.

Surface / orbital installations: Ceres is the major food production center in the Main Belt, with its water ice mantle providing ample water and oxygen to numerous, large underground hydroponic farms and livestock enclosures. Ceres also houses the famous 'Gardens of Eden', a major tourist attraction for spacers longing to see natural vegetation. One major city and spaceport (Demeter, population: 1,738,000 (official) / 2,255,000 (actual)) and seventeen other, smaller cities. Total population of 13.5 million (official) /15.1 million (actual). Some high-tech industries (electronics, bio-medical, genetics). Ceres houses one of the few anti-matter production facilities that exist in the system.

Jupiter : Gas giant outer planet. Has a powerful magnetosphere, a faint rings system and 63 satellites, of which 47 are less than 10 km in diameter. Semi-autonomous

colony of the Terran Federation, administered by the Jovian Governorate. Governor: **Janet Robeson** (58 y.o., married, 2 children, born on Callisto). Robeson is the first governor born in the system, having recently replaced Governor Vikrany, who had died of a sudden illness. Robeson is resolved to protect the citizens of Jupiter from the excessive demands from Earth.





Distance to Sun: 4.95 – 5.46 AU.

Diameter: 143,000 km.

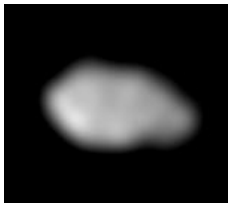
Local gravity: 24.79 m/s2 (2.528 G). Density of 1.326.

Orbit / rotation: Orbital period of 11.86 years. Inclination of 1.3 degrees. Very fast rotation of 9.92 hours.

Atmosphere : 5,000 km-deep atmosphere of hydrogen (90%), helium (10%) and traces of methane, ammonia, HD, ethane and water, with 50 km-deep layer of ammonia and sulphur clouds. Wind speeds of 360 km/h.

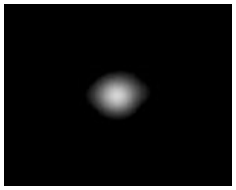
Surface temperatures: 112 – 165 K. Core of rock under dense layer of metallic hydrogen, then liquid hydrogen and helium, then hydrogen and helium gas.

Moons: 63 satellites, of which 47 are less than 10 km in diameter. Faint rings system. The biggest moons are:

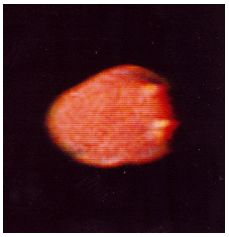


- **Metis (1):** Irregular shape, 60 km x 40 km x 34 km. Made of water ice. Metis houses a way-station and transit point for the gas-mining ships and drones exploiting the upper atmosphere of Jupiter. Houses one of few isotopic cryogenic fuel facilities in the whole Solar System. It also houses an outpost of the Space Search and Rescue Services (SSRS).

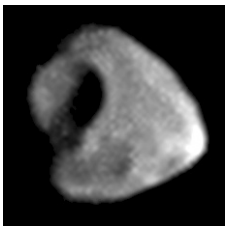
- **Adrastea (2):** Irregular shape, 20 km x 16 km x 14 km. Made of water ice.



- **Amalthea (3):** Irregular shape, 250 km x 146 km x 128 km. Surface temperature of 120 K (mean). Reddish surface color. Made of water ice covered with sulphur dust. Synchronous orbit with Jupiter.

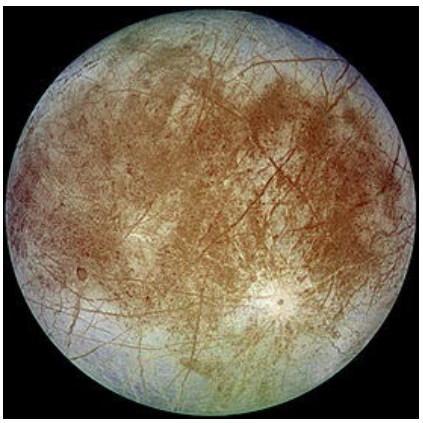


- **Thebe (4):** Irregular shape, 116 km x 98 km x 84 km. Surface temperature of 124 K. Synchronous orbit with Jupiter. Made of water ice. Houses an ice-mining facility.



- **Io (5):** Diameter of 3660 km. Orbital period of 1.77 days. Density of 3.528, gravity of 1.796 m/s2 (0.183G). Surface temperature of 90 – 130 K. Trace atmosphere of sulphur dioxide. Mostly silicate rock over molten iron sulphide core. Extremely volcanic moon. Resides inside intense radiation belt (Io Plasma Torus). High levels of local radiation and highly corrosive environment make Io uninhabitable.

- **Europa (6):** Diameter of 3121 km. Orbital period of 3.55 days. Synchronous orbit with Jupiter. Density of 3.01, gravity of 1.314 m/s2 (0.134 G). Surface temperatures of 50 – 125 K. Tenuous O2 atmosphere. Made of layer of surface water ice 30 km-thick over layer of warm ice, over liquid salt water ocean at depth of



100 km, then silicate rock layers over molten iron core. Some local primitive life forms found clustered around warm volcanic vents at bottom of sea. Main installation is Europa One, a large city and spaceport built under the ice (population: 1,760,000). One of main food production centers of the Outer System.

- **Ganymede (7):** Diameter of 5262 km (largest moon in Solar System). Orbital period of 7.15 days. Synchronous orbit with Jupiter. Density of 1.936, gravity of 1.428 m/s2 (0.146 G). Surface temperatures of 70 – 152 K. Trace atmosphere of O2. Made half of water ice and half silicate rock, with iron liquid core. Saltwater ocean around 200 km under ice surface. Has its own magnetic field. Radiation level at surface produces 8 Rems/day. Unfit for human occupation.

- **Callisto (8):** Diameter of 4820 km. Orbital period of 16.69 days. Synchronous orbit with Jupiter. Density of 1.834, gravity of 1.235 m/s2 (0.126 G). Surface temperatures of 80 – 165 K. Tenuous CO2 and O2 atmosphere. Made half of water ice, half of silicate rock, with diverse surface and a subsurface ocean below 100 km. Low local radiation levels at the surface (0.01 Rem/day). Seat of the Jovian Governorate. Fifteen main settlements, including city of Callisto Prime (population: 1,935,000). Primary industries are shipbuilding, space structures construction, food production, electronics, medical research and human services.

- **Himalia (11):** Irregular ball, diameter of approx 170 km. Orbital period of 250.56 days. Density of 2.6, gravity of 0.062 m/s2. Surface temperature of 124 K. No atmosphere.

- **Lysithea (12):** Irregular ball, diameter of approx 36 km. Orbital period of 259.2 days. Density of 2.6, gravity of 0.013 m/s2. Surface temperature of 124 K. No atmosphere.

- **Elara (13):** Irregular ball, diameter of approx 86 km. Orbital period of 259.6 days. Density of 2.6, gravity of 0.031 m/s2. Surface temperature of 124 K. No atmosphere.

- **Ananke (31):** Irregular ball, diameter of approx 28 km. Orbital period of 610.45 days. Retrograde, highly inclined (148.9 degrees) orbit. Density of 2.6, gravity of 0.010 m/s2. Surface temperature of 124 K. No atmosphere.

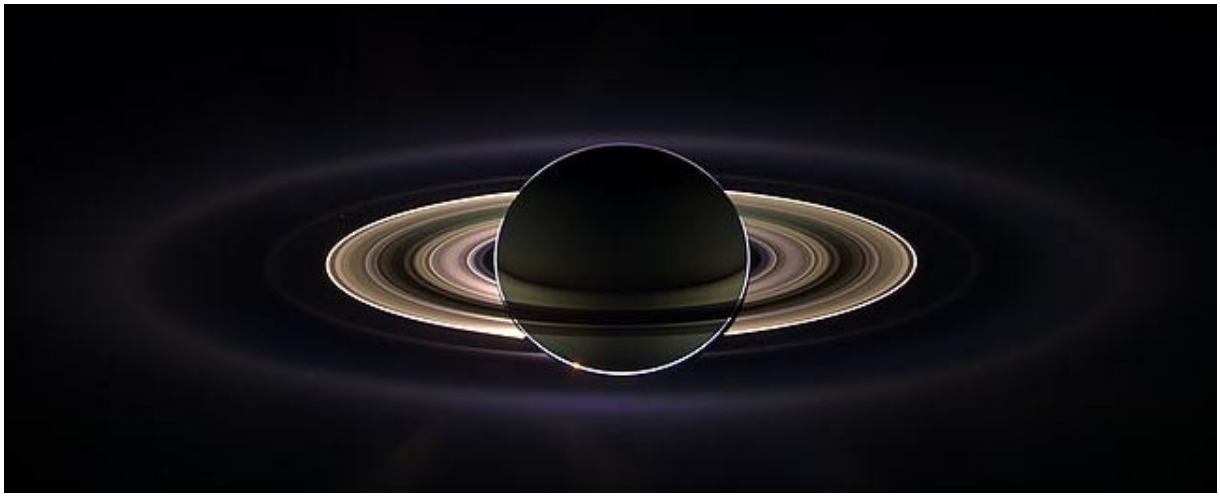
- **Carme (45):** Irregular ball, diameter of approx 46 km. Orbital period of 702.28 days. Retrograde, highly inclined (164.9 degrees) orbit. Density of 2.6, gravity of 0.017 m/s2. Surface temperature of 124 K. No atmosphere.

- **Pasiphae (53):** Irregular ball, diameter of approx 60 km. Orbital period of 764.08 days. Retrograde, highly inclined (145.24 degrees) orbit. Density of 2.6, gravity of 0.022 m/s2. Surface temperature of 124 K. No atmosphere.

- **Sinope (59):** Irregular ball, diameter of approx 38 km. Orbital period of 724.1 days. Retrograde, highly inclined (128.11 degrees) orbit. Density of 2.6, gravity of 0.014 m/s2. Surface temperature of 124 K. No atmosphere.

Surface / orbital installations: No surface installations on Jupiter itself. Surface/orbital installations on/around Metis, Thebe, Europa and Callisto. Total population of Jupiter system is 10.92 million people .

Saturn : Gas giant outer planet. Semi-autonomous colony of the Terran Federation. Governor: **Juan Perez** (65 y.o., married, 4 children), a physically and mentally tough politician who has come through long years of service in the Outer System to appreciate the resilience and resourcefulness of Spacers. Perez is in good terms with Governor Robeson of Jupiter and is secretly contemptuous of Grand Administrator John Li, whom he believes to be a demagogue interested only in preserving his personal power.



Distance to Sun: 9.05 – 10.11 AU.

Diameter: 120,540 km.

Local gravity: 10.44 m/s2 (1.065 G). Density of 0.687.

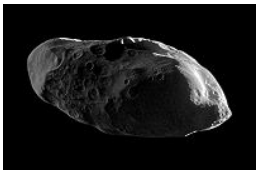
Orbit / rotation: Orbit period of 29.46 years. Inclination of 2.48 degrees.

Atmosphere : 59.5 km thick, mostly hydrogen, with some helium, ammonia, methane, HD. Wind speeds of up to 1800 km/h. Weak magnetic field extending slightly beyond orbit of Titan.

Surface temperatures: 84 – 134 K. Liquid hydrogen and helium over metallic hydrogen core.

Moons: System of nine rings and 62 moons (13 with diameter of more than 50 km).

- **Prometheus:** Irregular shape. 123 km x 79 km x 61 km. Way-station and transfer point for gas-mining ships and drones. Houses one of few isotopic cryogenic fuel facilities in the whole Solar System. Also houses an outpost of the Space Search and Rescue Services (SSRS).

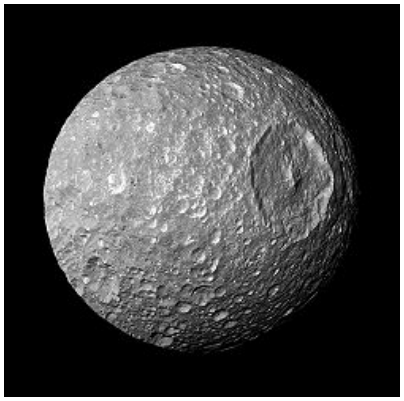


- **Pandora:** Irregular shape. 103 km x 80 km x 64 km.

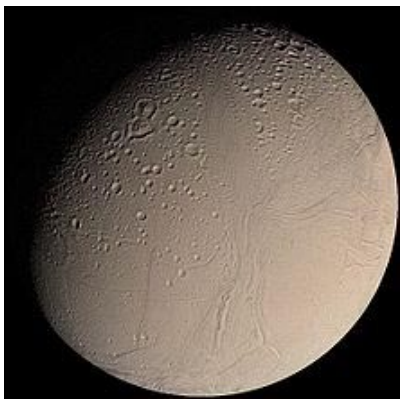
- **Epimetheus:** Irregular shape. 116 km x 117 km x 106 km.

- **Janus:** Irregular shape. 195 km x 194 km x 152 km.

- **Mimas:** Rough sphere. 415 km x 394 km x 381 km. Synchronous orbit with Saturn. Density of 1.15, gravity of 0.064 m/s2. Composed mostly of water ice, with rocky core. Surface temperature of 64 K. No atmosphere. Home of Mimas Agro Corporation, a food production enterprise.

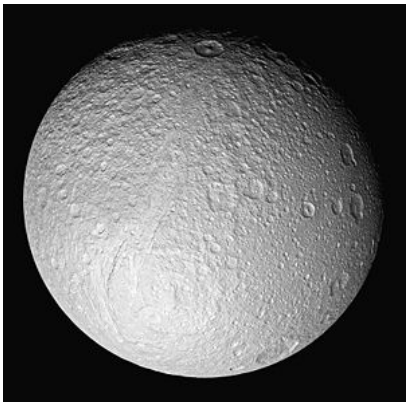


- **Enceladus:** Rough sphere. 513 km x 503 km x 497 km. Synchronous orbit with Saturn. Density of 1.61, gravity of 0.111 m/s2. Mantle of water ice over liquid salt water ocean and rocky molten core. Trace atmosphere of water vapour. Surface temperature of 75 K. Home of Enceladus

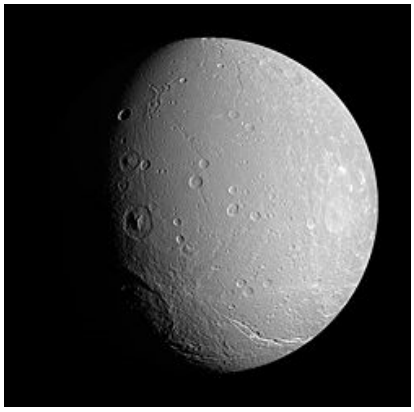


Dairy Farms, the biggest producer of dairy products in the Outer system.

- **Tethys:** Diameter of 1066 km. Density of 0.973, gravity of 0.145 m/s2. Synchronous orbit with Saturn. Composed mostly of water ice. Has two coorbital moons, Telesto and Calypso. No atmosphere. Surface temperature of 86 K. Houses a few under-ice agricultural farms.

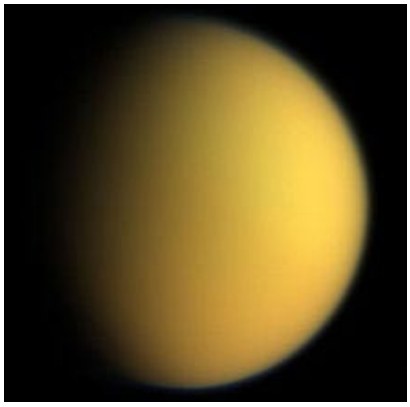


- **Dione:** Diameter of 1123 km. Density of 1.47, gravity of 0.231 m/s2. Synchronous orbit with Saturn. Surface temperature of 87 K. No atmosphere. Water ice mantle and rocky core. Home to huge chicken and fish farms.

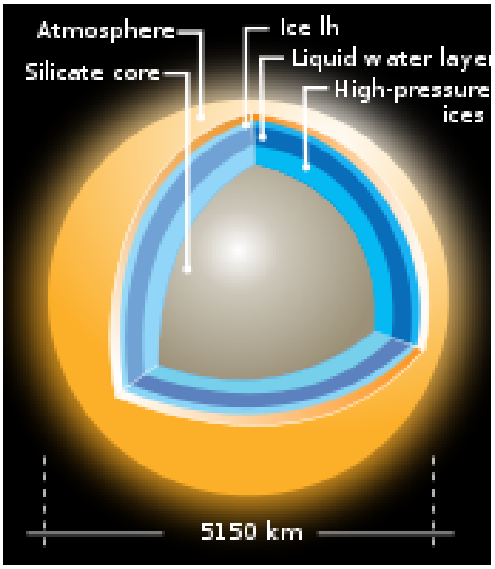


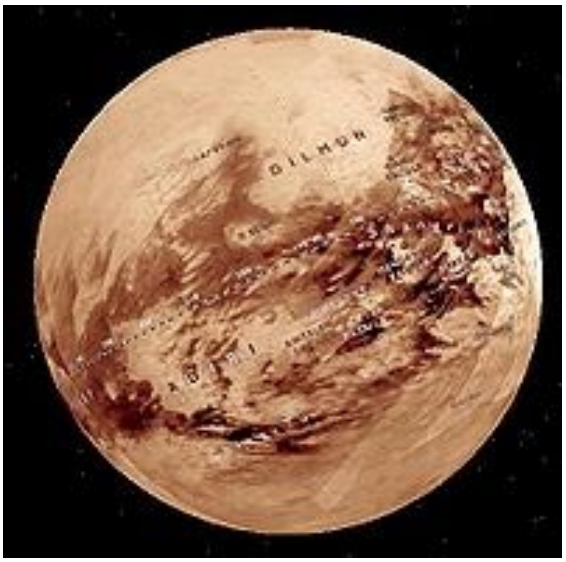
- **Rhea:** Diameter of 1529 km. Density of 1.23, gravity of 0.264 m/s2. Synchronous orbit with Saturn. Surface temperature of 53 K to 99 K. Mostly water ice over rocky core. No atmosphere. Home to cattle farms and a large meat processing plant.

- **Titan:** Diameter of 5151 km. Density of 1.88, gravity of 1.35 m/s2 (0.14 G). Synchronous orbit with Saturn. Dense atmosphere of nitrogen and methane, with methane and ethane clouds. Lakes and seas of liquid methane/ethane. Surface temperature of 94 K. Rock core covered by



layers of water and ammonia ice. Titan is home of the Saturn Governorate and houses extensive chemical and plastic industries that exploit the surface methane, ethane and nitrogen. Deep wells to the water layers feed a total of 43 cities and industrial centers with air and water. Main astroport and capital city of Titan Magnus (population: 2.56 million people). Total population of Titan is 26.2 million people.





- **Hyperion:** Irregular shape. 328 km x 260 km x 214 km. Density of 0.566, gravity of 0.02 m/s2. Chaotic rotation, orbital resonance with Titan. Composed mostly of water ice, with small rocky part. No atmosphere.

- **Iapetus:** Rough sphere. Diameter of 1471 km. Density of 1.08, gravity of 0.223 m/s2. Synchronous orbit with Saturn. Mostly water ice, with small rocky core. Surface temperatures of 100 – 130 K. No atmosphere. Home to number of under-ice agricultural and cattle farms, plus three food processing centers.

- **Phoebe:** Irregular shape. 230 km x 220 km x 210 km. Density of 1.63, gravity of 0.049 m/s2. Orbit inclination of 151 degrees to Saturn's equator. Orbital period of 550.5 days. Retrograde orbit, shepherds the large, nearly invisible Phoebe Ring. Surface temperature of 75 K. Made half of water ice, half of rock, with surface CO2 ice.

Surface / orbital installations: Various cities, industries and installation on/around Prometheus, Mimas, Enceladus, Tethys, Dione, Rhea, Titan and Iapetus. Total population of Saturn System: 48.8 million people.

Uranus : Gas giant outer planet. Dependency of the Saturn Governorate.

Distance to Sun: 18.37 – 20.08 AU.

Diameter: 51,120 km.

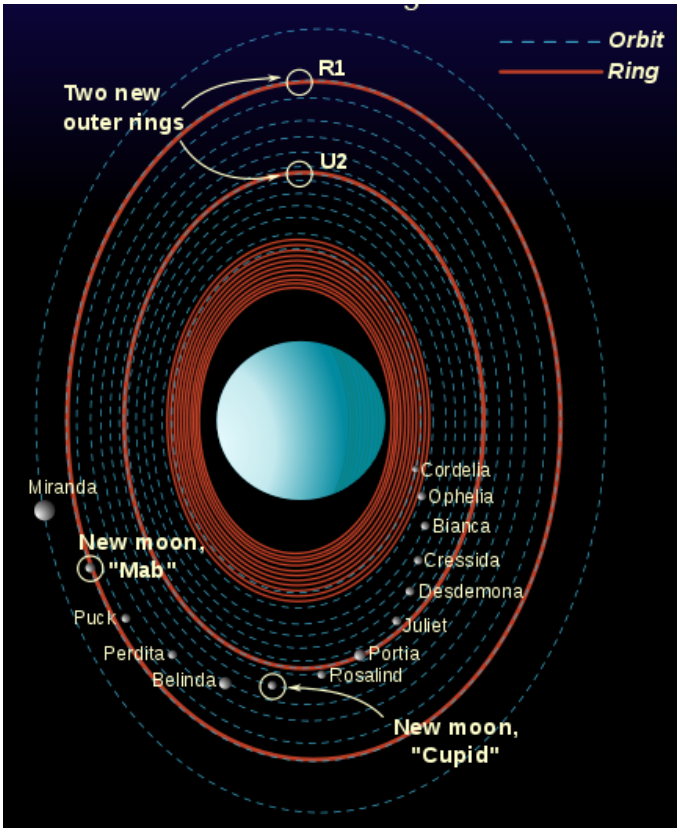
Local gravity: 8.69 m/s2 (0.886 G). Density of 1.27.

Orbit / rotation: Period of 84.32 years. Inclination of 0.77 degrees. Axial tilt of 97.77 degrees.

Atmosphere: Thick hydrogen and helium atmosphere, with some methane and traces of Hydrogen Deuterium.

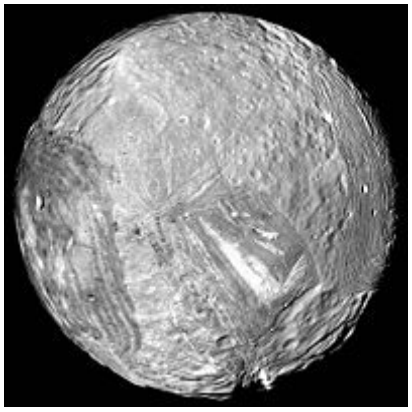
Surface temperatures: 49 – 57 K.

Moons: 27 moons, plus ring system.

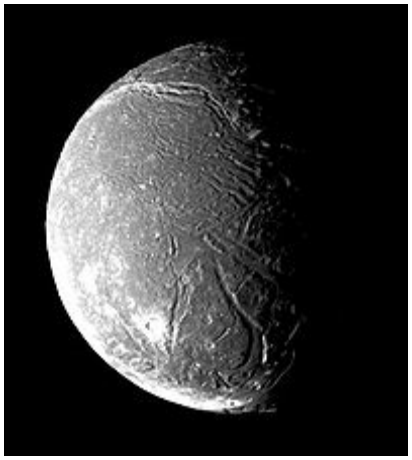


- **Cordelia:** Diameter of 40 km. Shepherd moon inside rings.

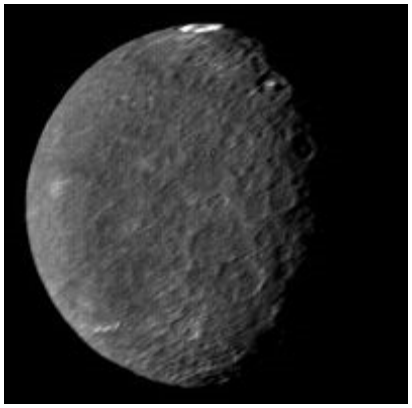
- **Ophelia:** Diameter of 43 km. Shepherd moon inside rings.
- **Bianca:** Diameter of 51 km.
- **Cressida:** Diameter of 80 km.
- **Desdemona:** Diameter of 64 km.
- **Juliet:** Diameter of 94 km.
- **Portia:** Diameter of 135 km.
- **Rosalind:** Diameter of 72 km.
- **Cupid:** Diameter of 18 km.
- **Belinda:** Diameter of 90 km.
- **Perdita:** Diameter of 30 km.
- **Puck:** Diameter of 162 km.
- **Mab:** Diameter of 25 km.
- **Miranda:** Diameter of 472 km. Density of 1.2. Gravity of 0.079 m/s2. No atmosphere. Mostly made of water ice, with rocky core. Synchronous orbit with Uranus. Orbital period of 1.41 days.



- **Ariel:** Diameter of 1158 km. Density of 1.66. Gravity of 0.27 m/s2. No atmosphere. Synchronous orbit with Uranus. Orbital period of 2.52 days. Water ice crust with some CO2 over rocky core. Strongly bombarded by charged particles from Uranus' magnetosphere, thus is unfit for human occupation.



- **Umbriel:** Diameter of 1169 km. Density of 1.39, gravity of 0.23 m/s2. No atmosphere. Synchronous orbit with Uranus. Orbital period of 4.14 days. Orbit lies inside Uranus' magnetosphere, leading to strong charged particles bombardment. Water ice crust, with some CO2, over rocky core. Unfit for human occupation.



- **Titania:** Diameter of 1577 km. Density of 1.71, gravity of 0.38 m/s2. Very tenuous CO2 atmosphere. Synchronous orbit with Uranus. Orbital period of 8.7 days. Mantle of water ice, with some CO2, over rocky core. Home to some under-ice farms and food production centers.

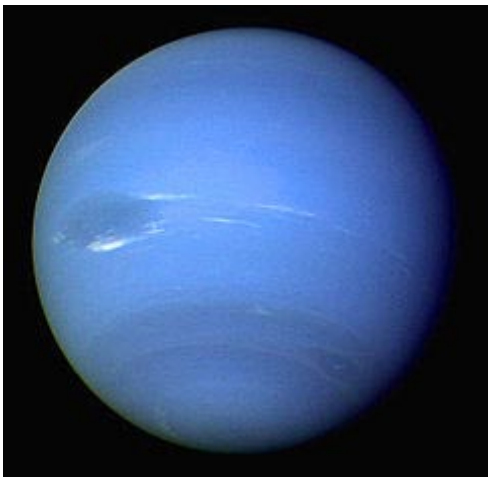
- **Oberon:** Diameter of 1523 km. Density of 1.63, gravity of 0.348 m/s2. No atmosphere. Synchronous orbit with Uranus. Orbital period of 13.46 days. Orbit partly outside Uranus' magnetosphere. Mantle of water ice over core of rock and organic compounds. Main center in Uranus System, with seven cities and industrial/agricultural centers and total population of 5.83 million people.

- **Francisco:** Diameter of 22 km.
- **Caliban:** Diameter of 72 km. Retrograde orbit.
- **Stephano:** Diameter of 32 km. Retrograde orbit.

- **Trinculo:** Diameter of 18 km. Retrograde orbit.
- **Sycorax:** Diameter of 150 km. Retrograde orbit.
- **Margaret:** Diameter of 20 km.
- **Prospero:** Diameter of 50 km. Retrograde orbit.
- **Setebos:** Diameter of 48 km. Retrograde orbit.
- **Ferdinand:** Diameter of 20 km. Retrograde orbit.

Surface / orbital installations: Installations on/around Titania and Oberon. Total population of 7.04 million people.

Neptune: Gas giant outer planet. Dependency of Saturn Governorate.



Distance to Sun: 29.76 – 30.44 AU.

Diameter: 49,520 km

Local gravity: 11.15 m/s2 (1.14 G)

Orbit / rotation: Period of 164.79 years. Inclination of 1.76 degrees.

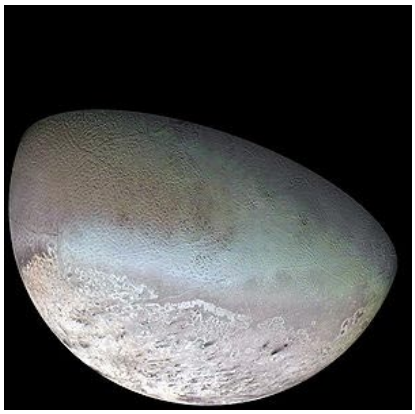
Atmosphere : Thick atmosphere of hydrogen and helium gas, some methane and traces of Hydrogen Deuterium and of ethane.

Surface temperatures : 55 – 72 K.

Moons: Total of 13 moons, plus a faint, fragmented ring system.

- **Naiad:** Irregular shape (96 x 60 x 52 km). Way-station and transfer point for gas-mining ships and drones. Houses one of few isotopic cryogenic fuel production facilities in whole Solar System. Also houses an outpost of the Space Search and Rescue Services (SSRS).
- **Thalassa:** Irregular shape (108 x 100 x 52 km).
- **Despina:** Irregular shape (180 x 148 x 128 km).
- **Galatea:** Irregular shape (204 x 184 x 144 km).

- **Larissa:** Irregular shape (216 x 204 x 168 km).
- **Proteus:** Irregular shape (436 x 416 x 402 km).



- **Triton:** Diameter of 2706 km. Retrograde orbit with period of 5.87 days (synchronous to Neptune). Gravity of 0.779 m/s2, density of 2.061. Surface crust of frozen nitrogen and water ice over water ice mantle and core of metal and rock. Tenuous nitrogen atmosphere. Surface temp of 38 K. Geologically active. Home to a population of 7.6 million people in 14 cities and industrial centers, plus 3 food production centers.

- **Nereid:** Diameter of 340 km.
- **Halimede:** Diameter of 62 km.
- **Sao:** Diameter of 44 km.
- **Laomedeia:** Diameter of 42 km.
- **Psamathe:** Diameter of 40 km.
- **Neso:** Diameter of 60 km.

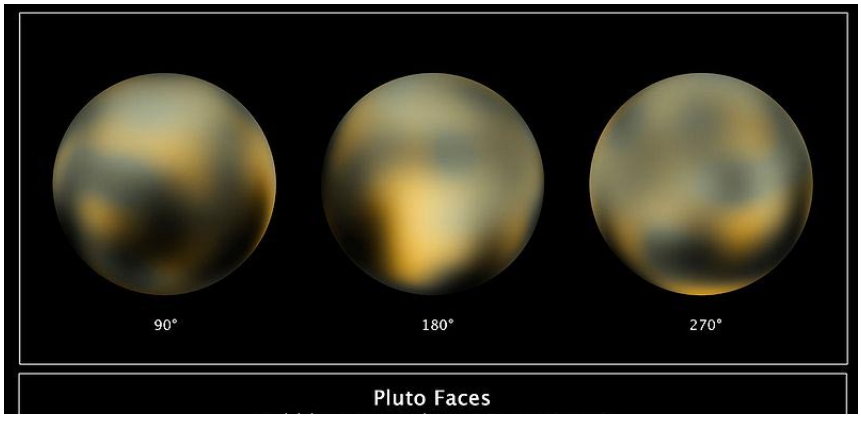
Surface / orbital installations: Installations on/around Naiad and Triton. Population of 7.9 million.

Pluto : Dwarf planet. Dependency of Saturn Governorate.

Distance to Sun: 30 – 49 AU.

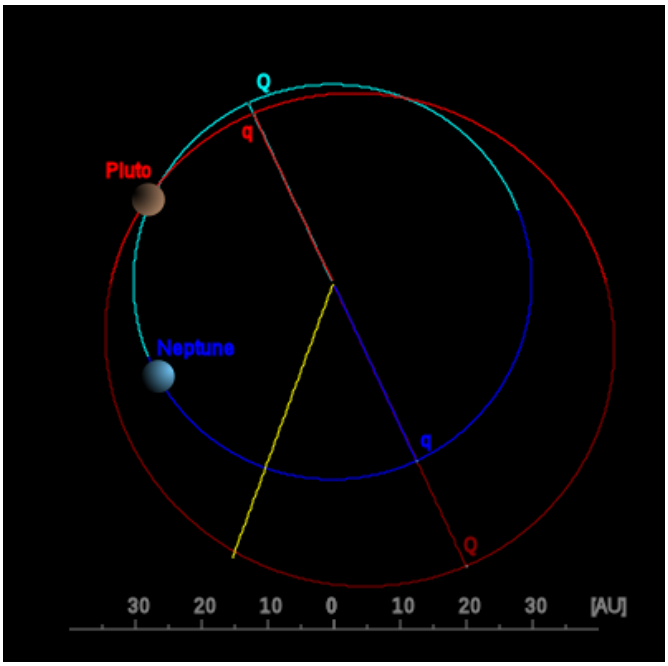
Diameter: 2390 km.

Local gravity: 0.658 m/s2.



Density of 2.03.

Orbit / rotation: Period of 248.09 years. Inclination of 17.14 degrees.



Atmosphere: Thin layer of nitrogen/methane/CO gas.

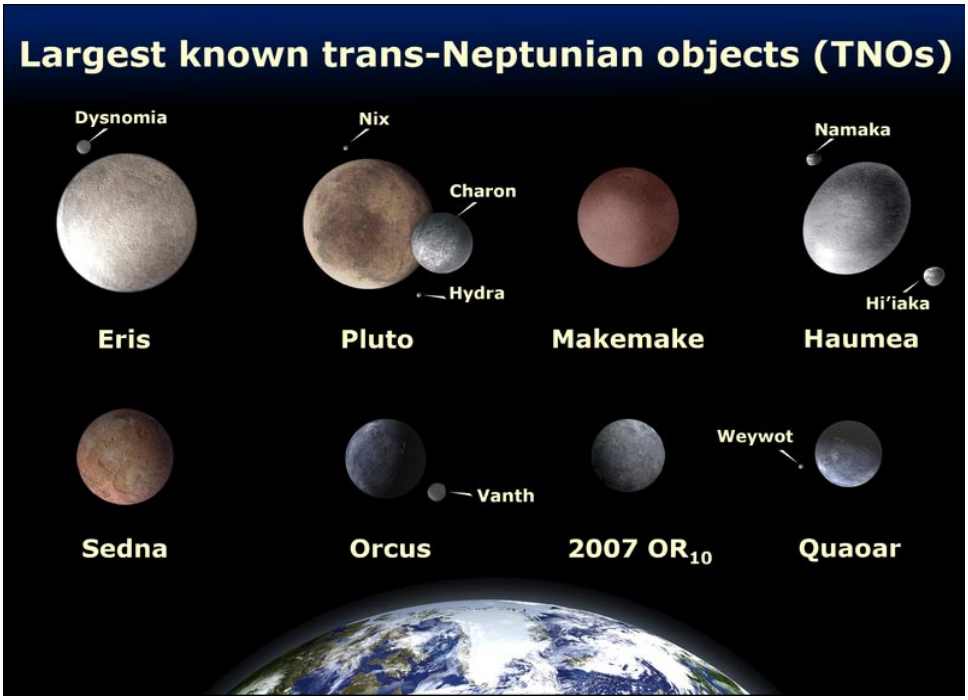
Surface temperatures: 33 – 55 K. Surface layer of nitrogen ice with traces of methane and CO2.

Moons:

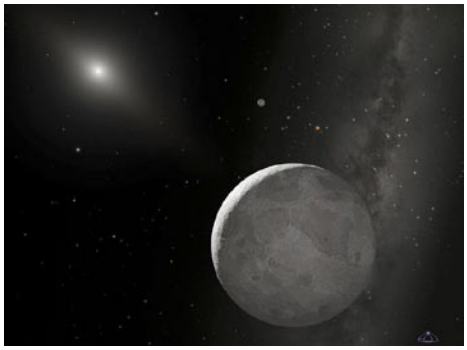
- **Charon:** Diameter of 1205 km.
- **Nix:** Diameter of 88 km.
- **Hydra:** Diameter of 72 km.
- **P4:** Irregular shape. Approximately 50 km X 30km.

Surface / orbital installations: Single astronomical observatory and base on Pluto.

<u>TNOs</u>: Still considered mostly virgin territory, with little to no human permanent presence.



Eris : Dwarf planet.

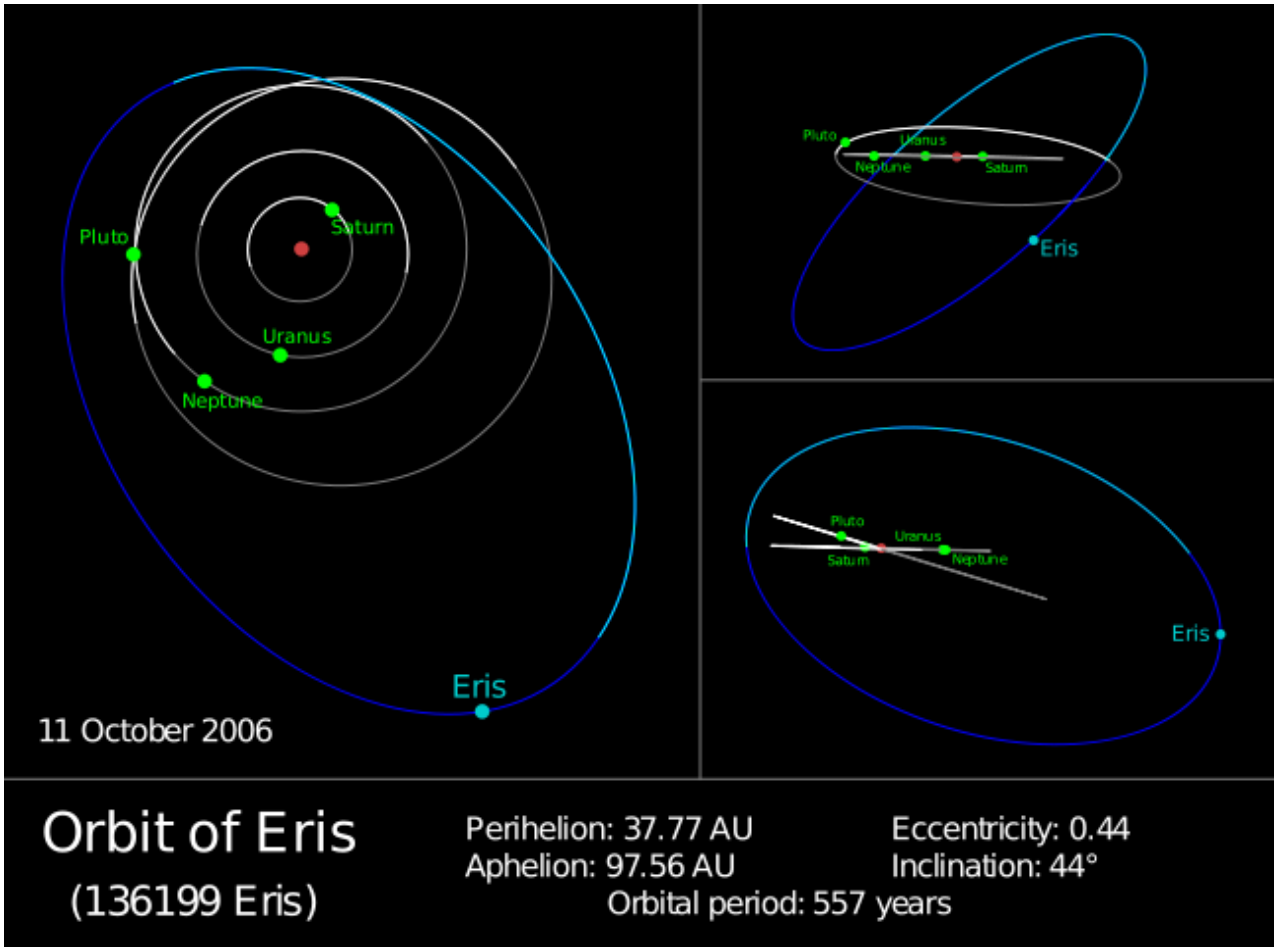


Distance to Sun: 37.77 – 97.56 AU

Diameter: Approx 2500 km

Local gravity: 0.8 m/s2. Density of 2.25.

Orbit / rotation:



Atmosphere: None

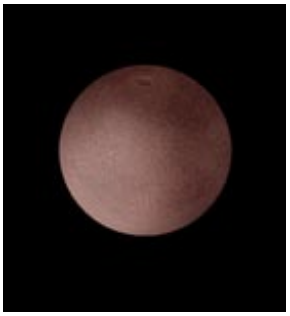
Surface temperatures: 30K – 55K. Surface cover of methane ice.

Moons:

- **Dysnomia:** Diameter of approx 100-250km (irregular shape). Orbital period around Eris of 15.77 days.

Surface / orbital installations: None.

Makemake: Dwarf planet.

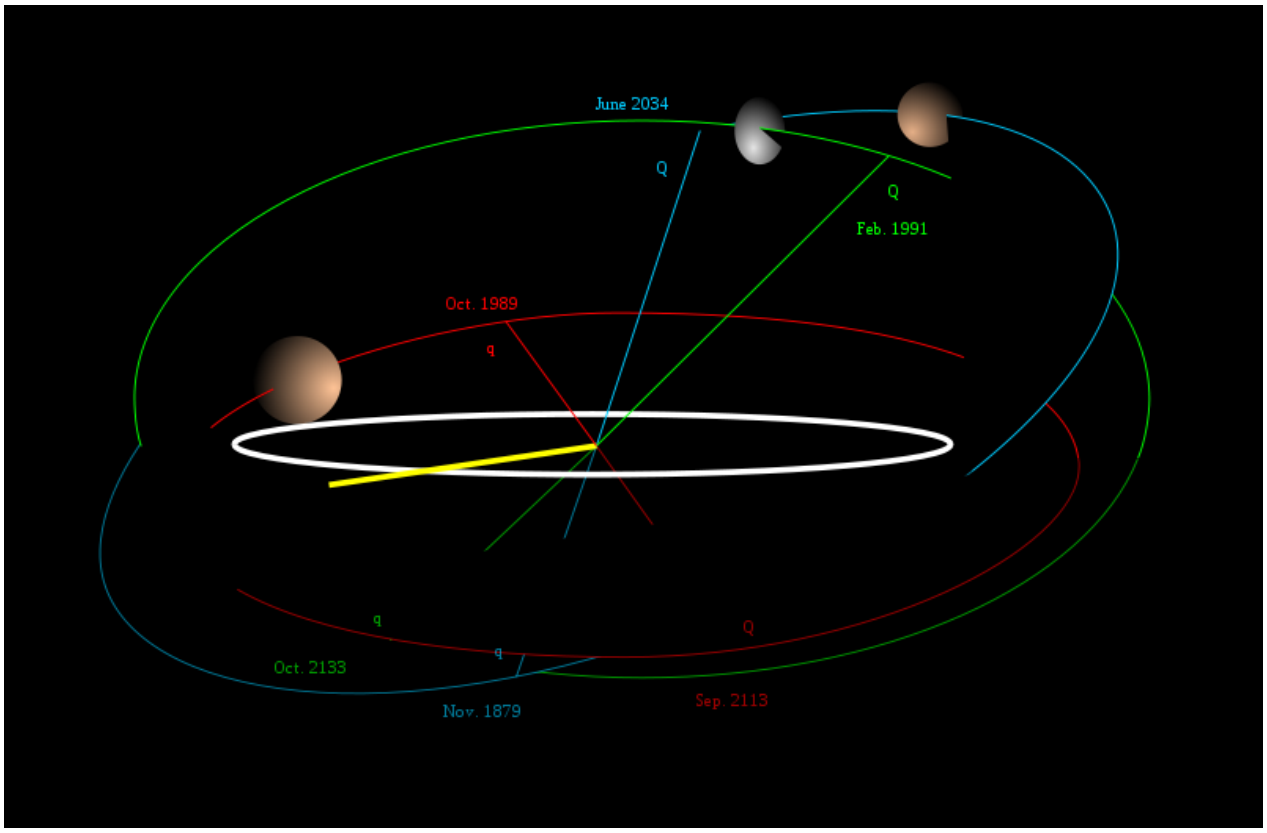


Distance to Sun: 38.51 – 53.07 AU.

Diameter: 1420 km

Local gravity: 0.4 m/s2. Density of 2.0.

Orbit / rotation: Period of 309.88 years. Inclination of 28.96 degrees.



Orbits of **Makemake** (blue), Haumea (green), contrasted with the orbit of Pluto (red) and the ecliptic (grey).

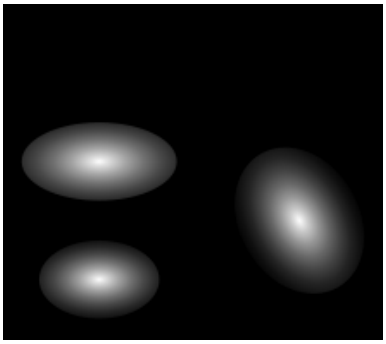
Atmosphere: Thin nitrogen atmosphere.

Surface temperatures: 30-35K. Surface cover of nitrogen and methane ice.

Moons: None.

Surface / orbital installations: None.

Haumea: Dwarf planet.

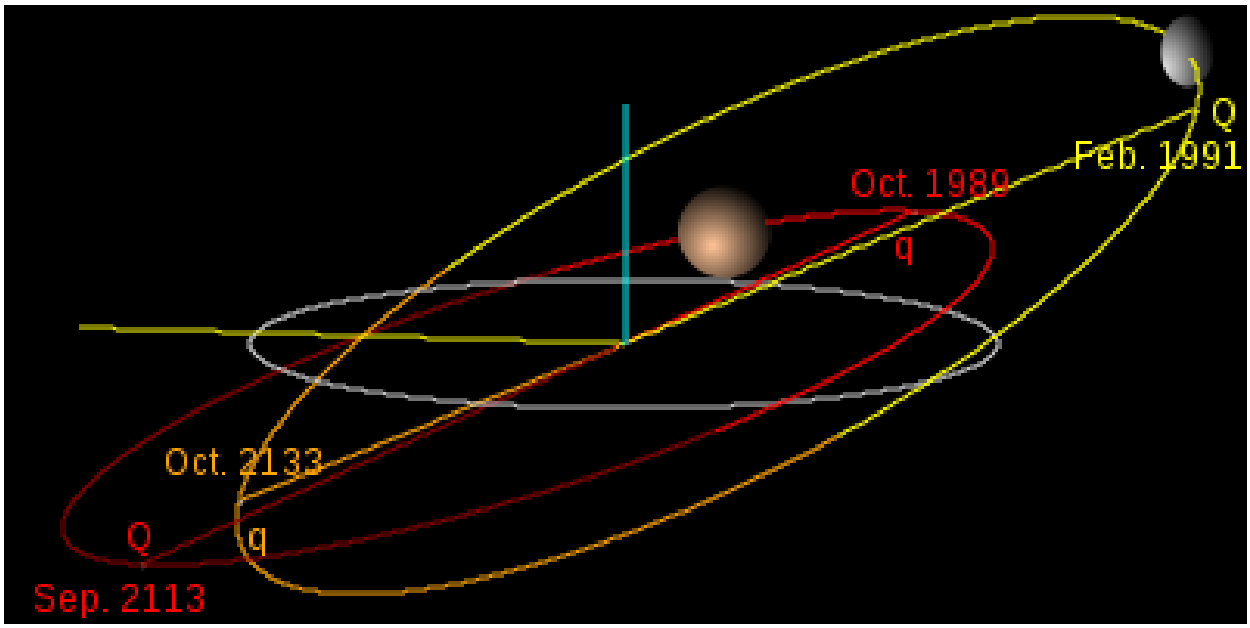


Distance to Sun: 34.72 – 51.54 AU.

Diameter: 1960 km X 1518 km X 996 km (ellipsoidal shape)

Local gravity: 0.44 m/s2. Density of 2.6 – 3.3.

Orbit / rotation: Period of 283.28 years. Inclination of 28.22 degrees.



Orbits of **Haumea** (yellow) and Pluto (red), relative to that of Neptune (grey).

Atmosphere: None.

Surface temperatures: 50K. Surface layer of water ice.

Moons:

- **Hi'iaka:** Diameter of 310 km.
- **Namaka:** No measurements available.

Surface / orbital installations: None.

Quaoar : Dwarf planet / TNO.

Distance to Sun : 41.93 – 45.28 AU.

Diameter : 890 km.

Local gravity : 0.376 m/s2. Density of 4.2.

Orbit / rotation: Period of 287.97 years. Inclination of 7.988 degrees.

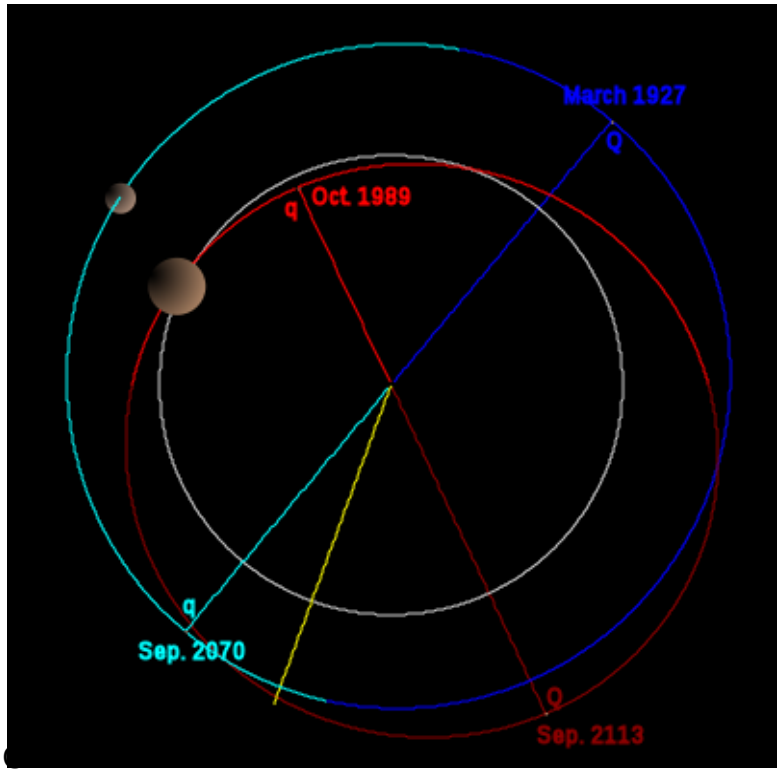
Atmosphere: None.

Surface temperatures: 43 K. Rock surface.

Moons:

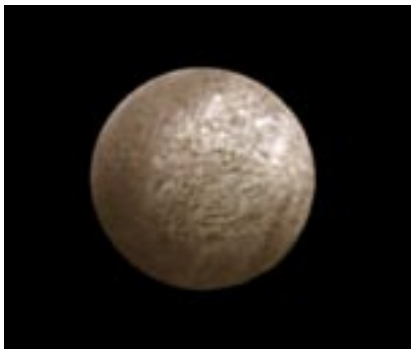
- **Weywot:** Diameter of 74 km.

Surface / orbital installations: None.



Orbits of Quaoar (blue) and Pluto (red).

Varuna: Dwarf planet / TNO.

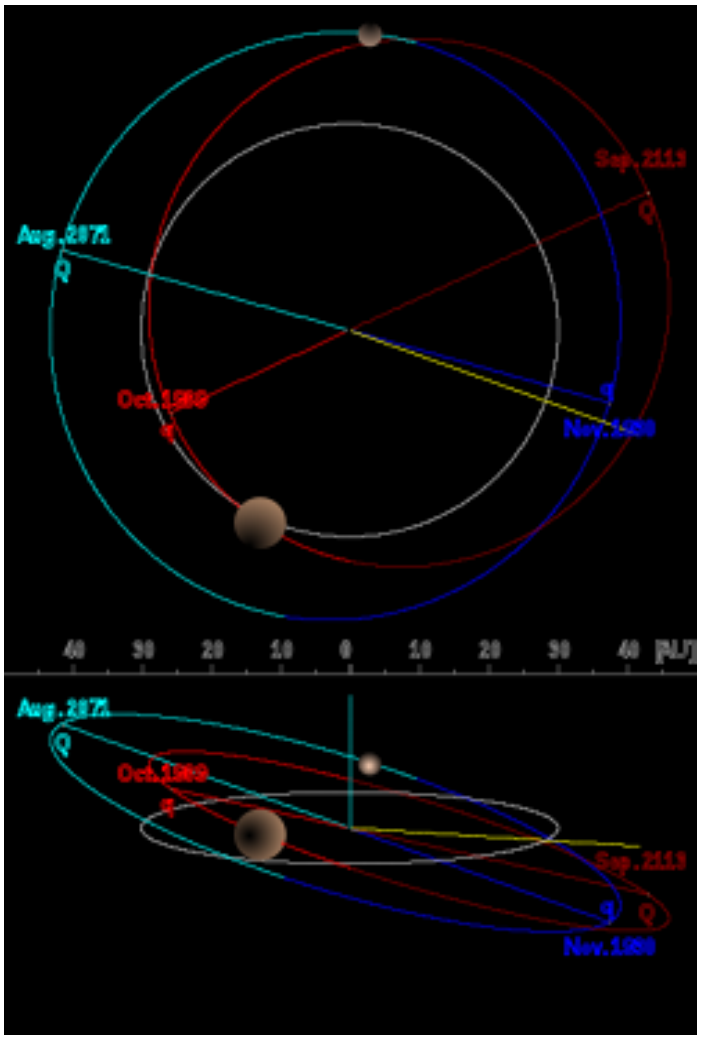


Distance to Sun : 40.91 – 45.33 AU.

Diameter : 550 km

Local gravity : 0.15 m/s2. Density of 0.992.

Orbit / rotation: Period of 283.2 years. Inclination of 17.2 degrees.



Orbits of Varuna (blue) and Pluto (red).

Atmosphere: None.

Surface temperatures: 41 – 43 K.

Moons: None.

Surface / orbital installations: None.

<u>Orcus</u>: Dwarf planet / KBO (Kepler Belt Object).

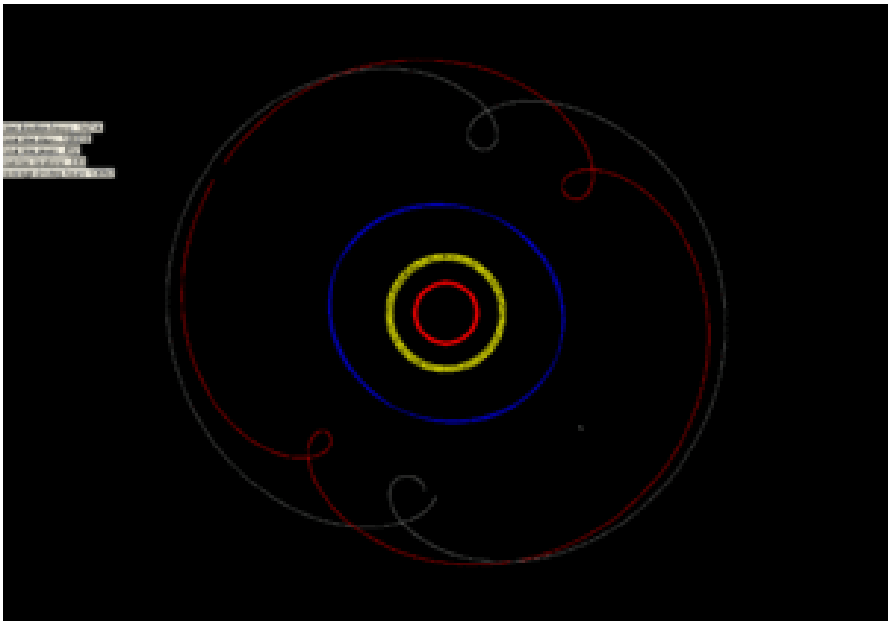
Distance to Sun : 30.32 – 48.05 AU.

Diameter : 900 km

Local gravity : 0.2 m/s2. Density of 1.5.

Orbit / rotation: Period of 245.33 years. Inclination of 20.59 degrees.

Atmosphere: None.

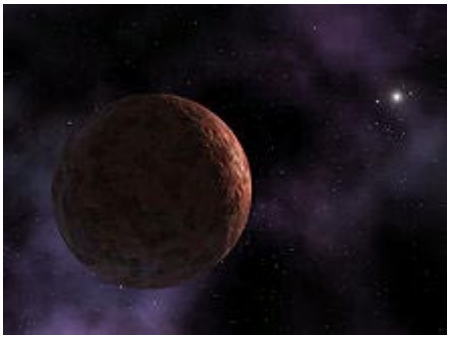


Surface temperatures: 44 K. Rocky surface with some water and methane ice cover.

Moons:

- **Vanth:** Diameter of approx 210 km.

Surface / orbital installations: None.



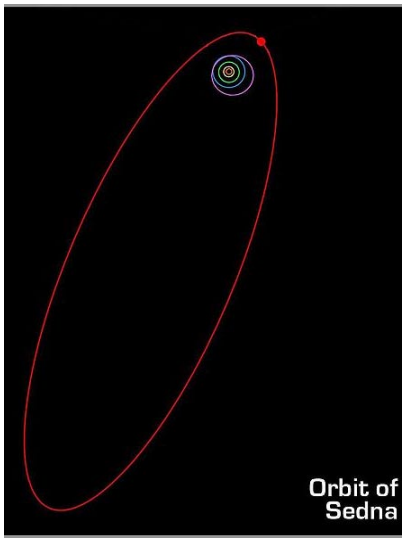
<u>Sedna</u>: Dwarf planet / KBO.

Distance to Sun : 76.36 – 960.78 AU.

Diameter : 1400 km.

Local gravity : 0.33 – 0.5 m/s2 (?). Density of 2.0 (?)

Orbit / rotation: Period of 11,809 years. Inclination of 11.93 degrees.



Atmosphere: None.

Surface temperatures: 12 K. Surface water ice and methane.

Moons: None.

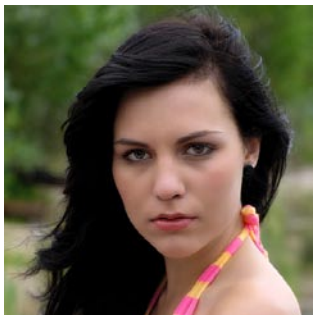
Surface / orbital installations: None.

Crewmembers and significant players in the novel:

Tina Forster: 28 y.o., 178 cm, 72 kg, brown hair, grey eyes, single, Canadian descent. Born on Titan. **Owner, First Pilot and Captain** of the cargo ship KOSTROMA, which she recently inherited from her veteran spacer uncle. Tina accepted to illegally carry a shipment of weapons to Mars to help the cause of Spacers against Earth.

Frida Skarsgard: 27 y.o., 175 cm, 65 kg, red-brown hair, blue eyes, single. Of Danish blood. Born on Callisto. **Second pilot** of the KOSTROMA.

Renée Dargenteuil: 36 y.o., 170 cm, 59 kg, brown hair, brown eyes, married, three children, French descent. Born on Europa. **Third pilot** of the KOSTROMA.

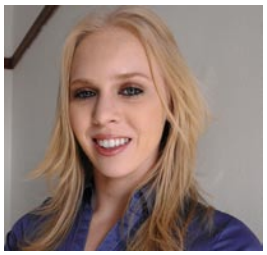


Dana 'DD' Durning: 32 y.o., 167 cm, 58 kg, black hair, brown eyes, married, two children, British descent. Born on Callisto. **Navigator** of the KOSTROMA.

Reena Shapour: 25 y.o., 170 cm, 56 kg, brown hair, brown eyes, single. Of Indian descent. Born on Titan. Certified genius. Diploma in astrophysics and astronomy. **Second navigator** on the KOSTROMA.

Yoko Teino: 24 y.o., 168 cm, 53 kg, black hair, brown eyes, single. Of Japanese descent. Born on Oberon. **Third navigator** on the KOSTROMA.

Ingrid Holtz: 25 y.o., 179 cm, 75 kg, blond hair, blue eyes, single, German descent. **Sensors/communications specialist** on the KOSTROMA.



Patricia O'Neil: 26 y.o., 181 cm, 70 kg, red hair, green eyes, divorced, Irish descent. Born on Callisto. **Sensors and communications specialist** on the KOSTROMA.

Amin Jamilian: 36 y.o., 178 cm, 80 kg, black hair, brown eyes, divorced, Algerian descent. Born on Callisto. **Sensors and communications specialist** on the KOSTROMA.

Germaine Brown: 30 y.o., 182 cm, 77 kg, black hair, brown eyes, single, African-American descent. Born on Vesta. **Sensors and communications specialist** on the KOSTROMA.

Anwar Duharto: 31 y.o., 175 cm, 76 kg, black hair, black eyes, married, four children, Indonesian descent. Born on Europa. **Sensors and communications specialist** on the KOSTROMA.

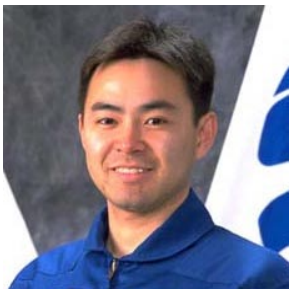
Minh Wa Hien: 28 y.o., 163 cm, 54 kg, black hair, brown eyes, single, Vietnamese descent. Born on Callisto. **Sensors and communications specialist** on the KOSTROMA.

Rose Tillman: 38 y.o., 178 cm, 62 kg, Brown hair, blue eyes, divorced, Australian descent. Born on a ship near Pluto. **Chief engineer** of the KOSTROMA.

Jim Lowell: 37 y.o., 181 cm, 82 kg, brown hair, brown eyes, married, three children, American descent. Born on Titan. **Second engineer** of the KOSTROMA.

Martha Lang: 34 y.o., 177 cm, 66 kg, blonde hair, grey eyes, married, two children, German descent. Born on ship in Jupiter orbit. **Third engineer** of the KOSTROMA.

Isawa Hiro: 33 y.o., 174 cm, 68 kg, brown hair, brown eyes, married, three children, Japanese descent. Born on Titania. **Informatician** on the KOSTROMA.



Vincent Reed: 33 y.o., 181 cm, 84 kg, shaved head (natural brown hair), brown eyes, brown skin, single. Mixed North American-Caribbean stock. Born on Earth. Moved at young age to Callisto with his family. **Electronician** on the KOSTROMA.

Julia Smith: 28 y.o., 177 cm, 73 kg, blond hair, blue eyes, single, American descent. Born on Triton. **Fusion propulsion engineer** on the KOSTROMA.

Karl Grundig: 35 y.o., 176 cm, 74 kg, blond hair, blue eyes, married, two children, Austrian descent. Born on Europa. **Life support systems engineer** of the KOSTROMA.

Gengis Kurganovich: 39 y.o., 166 cm, 69 kg, black hair, brown eyes, married, three children, Mongolian descent. Born on Hygiea. **Electrical engineer** on the KOSTROMA.

Henrik Farben: 41 y.o., 184 cm, 87 kg, black hair, grey eyes, small moustache and goatee, divorced, German descent. Born on Ceres. **Mechanical engineer** on the KOSTROMA.

Lisa Horrocks: 36 y.0., 178 cm, 71 kg, black hair, black eyes, married, three children, British descent. Born on Ceres. **Robotics engineer** on the KOSTROMA.

Suzan Smith: 38 y.o., 172 cm, 65 kg, black hair, black eyes, married, four children, American descent. Born on Callisto. **Hydraulics engineer** on the KOSTROMA.

Maria Perez: 32 y.o., 170 cm, 61 kg, black hair, brown eyes, single, Latina descent. Born on Europa. **Ship's doctor** of the KOSTROMA. Holds degrees in medicine and bio-chemistry.

Lian Wang: 24 y.o., 168 cm, 55 kg, black hair, brown eyes, single, very gracious and beautiful, Chinese descent. Born on Pallas. **Nurse** on the KOSTROMA. Also has diploma in physiotherapy.

Barbara Stronach: 26 y.o., 176 cm, 63 kg, blond hair, blue eyes, married, one child, American descent. Born on Titania. **Nurse and anaesthetist** on the KOSTROMA.

Rosa Jenkins: 24 y.o., 170 cm, 54 kg, black hair, brown eyes, single, South-African descent. Born on Vesta. **Nurse** on the KOSTROMA.

Erik Faltskog: 30 y.o., 182 cm, 82 kg, blond hair, blue eyes, single, Swedish descent. Born on Callisto. **Paramedic and male nurse** on the KOSTROMA.

Miguel Obrador: 32 y.o., 176 cm, 76 kg, black hair, brown eyes, married, two children, Argentinian descent. Born on Europa. **Paramedic and male nurse** on the KOSTROMA.

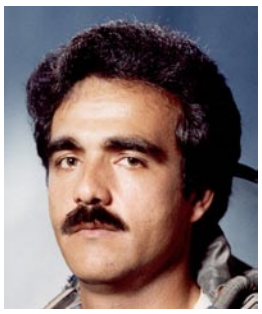
Minnie Kiswayo: 34 y.o., 174 cm, 61 kg, black hair, black eyes, married, one child, African descent. Born on Titania. **Ship's pharmacist** on the KOSTROMA.

Aisha Zawari: 31 y.o., 168 cm, 57 kg, black hair, black eyes, single, Lebanese descent. Born on Triton. **Assistant pharmacist** on the KOSTROMA.

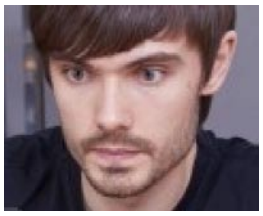
Denise Lonsdale: 34 y.o., 178 cm, 66 kg, black hair, brown eyes, married, two children. Of American descent. Born on Enceladus. **Cargomaster** of the KOSTROMA.

Ziva Goldman: 24 y.o., 164 cm, 53 kg, bbrown hair, brown eyes, single, Israeli descent. Born on Europa. **Cargo handling specialist and crane/forklift operator** on the KOSTROMA.

Roman Bondurov: 29 y.o., 176 cm, 70 kg, black hair, brown eyes, moustache, married, three children, of Central Caucasus descent. Born on Hygiea. **Cargo handling specialist and crane/forklift operator** on the KOSTROMA.



Javier Domingo: 26 y.o., 175 cm, 68 kg, brown hair, brown eyes, single, Spanish descent. Born on Callisto. **Cargo handling specialist and crane/forklift operator** on the KOSTROMA.



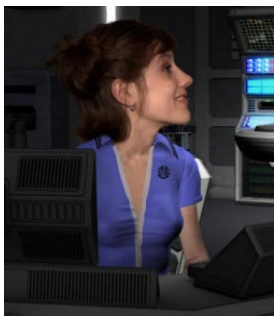
Piotr Romanski: 49 y.o., 174 cm, 79 kg, thinning brown hair, blue eyes, married, three children. Of Russian descent. Born on Callisto. Has diploma in space economics and in business. **Ship's Purser, Commercial Agent and Finance Officer** of the KOSTROMA.

Winnie Zambela: 28 y.o., 180 cm, 71 kg, black hair, brown eyes, married, two children, African descent. Born on Oberon. **Assistant purser** on the KOSTROMA.

Wei Zang: 42 y.o., 165 cm, 56 kg, black hair, black eyes, divorced, Chinese descent. Born on Callisto. **Ship's Supply Officer** of the KOSTROMA.

Natalia Vasilyeva: 29 y.o., 185 cm, 77 kg, blond hair, green eyes, single, Russian descent. Born on 10 Hygiea (Main Asteroid Belt). Tall, strong and beautiful young woman. **Ship's head hostess** for the passengers section of the KOSTROMA.

Diane Lebel: 26 y.o., 172 cm, 60 kg, brown hair, brown eyes, single, French descent. Born on Europa. **Ship's receptionist** for the passengers section of the KOSTROMA.

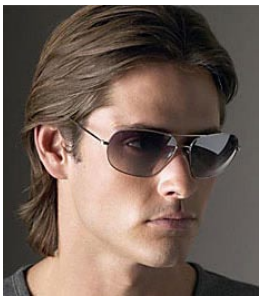


Bill Morrison: 42 y.o., 181 cm, 87 kg, brown hair, grey eyes, married, three children, British descent. Born on Triton. **Head of security** on the KOSTROMA.

Leo Sanchez: 24 y.o., 178 cm, 79 kg, blond hair, grey eyes, single, Mexican-American descent. Bborn on Titan. Martial arts expert. **Security guard** on the KOSTROMA.

Ahmed Jibril: 31 y.o., 180 cm, 83 kg, black hair, black eyes, married, two children, Arabic descent. Born on Earth. Weapons and explosives expert. **Security guard** on the KOSTROMA.

Lars Niström: 25 y.o., 183 cm, 82 kg, brown hair, green eyes, single, Danish descent. Born on Hygiea. Martial arts and weapons expert. **Security guard** on the KOSTROMA.



Jennifer Biddles: 26 y.o., 180 cm, 76 kg, blond hair, blue eyes, single, American descent. Born on Ceres. Martial arts and weapons expert. **Security guard** on the KOSTROMA.

Leila Kajirian: 37 y.o., 170 cm, 61 kg, black hair, brown eyes, widowed, Algerian-Armenian descent. Born on Ceres. **Ship's Chef** for the ship's cafeteria of the KOSTROMA.

Robert Leblanc: 30 y.o., 176 cm, 72 kg, black hair, brown eyes, married, one child, French descent. Born on Europa. **Cook** in the ship's cafeteria of the KOSTROMA.

Jorge Batista: 35 y.o., 174 cm, 71 kg, black hair, brown eyes, married, two children, Mexican descent. Born on Callisto. **Cook** in the ship's cafeteria of the KOSTROMA.

Kimi Jung: 24 y.o., 158 cm, 51 kg, black hair, black eyes, single, Korean descent. Born on Callisto. **Cook** in the ship's cafeteria of the KOSTROMA.

Petra Manzini: 36 y.o., 162 cm, 59 kg, brown hair, brown eyes, single, Italian descent. Born on Europa. **Manager of the lounge-bar** 'APEROSSIMO' on the KOSTROMA. Recognized expert taster in wines and alcohols.

Tiki Batrang: 19 y.o., 154 cm, 46 kg, black hair, black eyes, brown skinned, single. Of South-East Asian stock. Born on Earth, emigrated at young age with her family to Titan. Beautiful and delicate young woman. Has Roger Cummings smitten. **Waitress** in the KOSTROMA's lounge-bar 'APEROSSIMO'. Also works part-time in the crew cafeteria.

Maria Calabrini: 27 y.o., 166 cm, 54 kg, black hair, grey eyes, single, humorous and full of life. Of Italian descent. Born on Callisto. **Barmaid** in the KOSTROMA's lounge-bar 'APEROSSIMO'.

Lucy Wong: 24 y.o., 165 cm, 55 kg, black hair, brown eyes, single, of Chinese-American descent. Born on Europa. **Waitress** in the KOSTROMA's lounge-bar 'APEROSSIMO'.

Valentino Massera: 25 y.o., 174 cm, 75 kg, Brown hair, black eyes, married, one child, of Italian descent. Born on Ceres. **Barman** in the KOSTROMA's lounge-bar 'APEROSSIMO'.

'Madam' Lee: 53 y.o., 164 cm, 57 kg, black hair, black eyes, widowed, of Korean descent. Born on Hygiea. **Manager of the sex club** 'JUPITER' on the KOSTROMA.

Mark Cisco: 29 y.o., 189 cm, 93 kg, black hair, brown eyes, brown skin, very muscular. Single, of American descent. Born on Titan. Expert wrestler and boxer. Has a degree in psychology. **Receptionnist (aka bouncer) at the sex club** 'JUPITER' on the KOSTROMA.

Julie Walsh: 25 y.o., 176 cm, 63 kg, blond hair, blue eyes, single, British descent. Born on Callisto. **Barmaid at the sex club** 'JUPITER' on the KOSTROMA.

Joan Ferguson: 24 y.o., 175 cm, 64 kg, brown hair, brown eyes, single, British descent. Born on Callisto. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Keiko Musashi: 25 y.o., 166 cm, 57 kg, brown hair, brown eyes, single, Japanese descent. Born on Earth. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Vera Lutjens: 25 y.o., 177 cm, 65 kg, blond hair, blue eyes, single, Dutch descent. Born on Callisto. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Debbie Reynolds: 26 y.o., 174 cm, 62 kg, blond hair, blue eyes, single, American descent. Born on Ceres. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Xian Ziyi: 23 y.o., 162 cm, 53 kg, black hair, brown eyes, single, Chinese descent. Born on Earth. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Putu Sarawan: 24 y.o., 156 cm, 49 kg, black hair, brown eyes, single, Indonesian descent. Born on Earth. **Waitress and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Marcel Lafont: 28 y.o., 176 cm, 80 kg, black hair, grey eyes, single, French-Italian descent. Born on Earth. **Waiter and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Rick Westmore: 27 y.o., 182 cm, 85 kg, brown hair, green eyes, single, American descent. Born on Callisto. **Waiter and dancer at the sex club** 'JUPITER' on the KOSTROMA.

Valentina Suvarova: 25 y.o., 171 cm, 59 kg, dark brown hair, grey eyes, single. Of Russian descent. Born on Hygiea. **Tugboat/shuttle pilot** on the KOSTROMA.

Roger Cummings: 19 y.o., 179 cm, 76 kg, dark blond hair, blue eyes, single. Of American descent. Born on Pallas. Has shown early in life outstanding space piloting abilities. **Shuttle co-pilot** on the KOSTROMA.

Alan Ashford: 36 y.o., 180 cm, 82 kg, brown hair, brown eyes, married, two children, American descent. Born on Callisto. **Tugboat/shuttle pilot** on the KOSTROMA.

Yasmina Jumonji: 22 y.o., 176 cm, 61 kg, black hair, black eyes, single, African descent. Born on Europa. **Shuttle co-pilot** on the KOSTROMA.

Bjorn Falström: 33 y.o., 181 cm, 82 kg, blond hair, blue eyes, married, one child, Swedish descent. Born on Oberon. **Space welding specialist** on the KOSTROMA.

†Denis Sweeny: 36 y.o., 183 cm, 85 kg, black hair, brown eyes, married, three children, Jamaican descent. Born on Callisto. **Small craft maintenance technician** on the KOSTROMA. Killed by a racist mob in Mexico in 2315.

Samantha Wilders: 31 y.o., 172 cm, 57 kg, brown hair, grey eyes, married, one child, British descent. Born on Europa. **Small craft maintenance technician** on the KOSTROMA.

Billy Brumby: 24 y.o., 179 cm, 76 kg, black hair, brown eyes, single, Australian descent. Born on Ceres. **Small craft maintenance technician** on the KOSTROMA.

John Murdoch: 30 y.o., 178 cm, 78 kg, black hair, black eyes, married, one child, Canadian descent. Born on Titan. **Small craft maintenance technician** on the KOSTROMA.

Alexandr Karpov: 52 y.o., 177 cm, 75 kg, gray-black hair, brown eyes, divorced, Russian descent. Born on Hygiea. **Robotics repair specialist** on the KOSTROMA.

Lakshmi Suvarayati: 35 y.o., 166 cm, 53 kg, brown hair, brown eyes, divorced, Indian descent. Born on Callisto. **Electronics technician** on the KOSTROMA.

Michel Koniev: 27 y.o., 188 cm, 96 kg, single, blond hair, blue eyes, Russian descent. Born on Hygiea. **Captain in the Sverdlovsk Group Security Services**. Tall, strong, handsome and deadly. Loaned by Nadia Suslov to escort a clandestine shipment of weapons from the PMI to Mars.

Keiko Nomura: 26 y.o., 172 cm, 59 kg, black hair, brown eyes, single, Japanese descent. Born on Pallas. Young **Space Search and Rescue Services pilot**. Full of life and very pretty, but also responsible and thoughtful. Volunteers to pilot one of the fighter craft of the new Spacers League Forces.

Bradley Stinson: 25 y.o., 181 cm, 81 kg, brown hair, grey eyes, single, handsome, American descent. Born on Pallas. Young **SSRS pilot**. Volunteers to pilot one of the fighter craft of the new Spacers League Forces.

†John Li: 56 y.o., 176cm, 74 kg, black hair, brown eyes, married, 2 children. Born on Earth. **Grand Administrator of the Terran Federation**. Resolved to raise revenues to support the social masses on Earth by increasing taxes for the spacers. Assassinated by ISF troopers during the Khan coup.

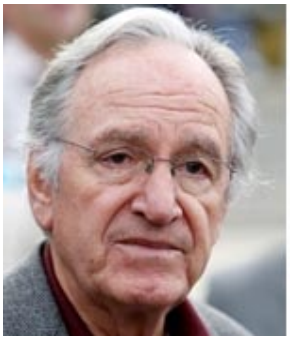
Janet Robeson: 58 y.o., 173 cm, 62 kg, grey-blond hair, green eyes, married, 2 children. Born on Callisto. **Governor of the Jupiter System**. Is opposed to increasing the fiscal burden on her citizens just to support the unemployed masses on Earth. She is ready to declare a secession of the Jupiter System from Earth.

Charles Watts: 62 y.o., 179 cm, 79 kg, grey-black hair, brown eyes, married, 3 children. Born on Mars. **Governor of Mars**. Opposed to the excessive fiscal demands and arbitrary taxes levied by Earth. Allies himself with Governor Robeson and Nadia Suslov to organise a secession from Earth. Wife killed by the ISF.

Nadia Suslov: 45 y.o., 174 cm, 56 kg, blond hair, blue eyes, divorced, one child. Born on Hygiea. **CEO of the Sverdlovsk Group**, which controls Hygiea. Fiery, cunning and ruthless executive. Holds the independence of her consortium and of the Hygiea region as non negotiable and is ready to fight Earth in order to curb its excessive demands. Allies herself to Governor Watts and Governor Robeson.

Juan Perez: 65 y.o., 176 cm, 82 kg, bald, brown eyes, married, 4 children, born on Earth. **Governor of the Saturn System**. A physically and mentally tough politician who has come through long years of service in the Outer System to appreciate the resilience and resourcefulness of Spacers. Perez is in good terms with Governor Robeson of Jupiter and is secretly contemptuous of Grand Administrator John Li, whom he believes to be a demagogue interested only in preserving his personal power.

Jacobus Stein: 69 y.o., 175cm, 74 kg, white hair, brown eyes, married, 6 children, born on Pallas. **CEO of the Pallas Mining Industries**. A brilliant metallurgical engineer and businessman. Stein is a secret business partner of Nadia Suslov and is tired of John Li's incessant money grab at the expense of spacers.



Karl Langemann: 56 y.o., 179 cm, 81 kg, grey-black hair, brown eyes, married, 2 children. **CEO of the Vesta Consortium**, which controls Vesta and the asteroids field around it in the Main Asteroid Belt. A fiercely competitive industrialist and highly competent geologist, he relies a lot on his most trusted aide, Agneta Braun. Langemann will discover and expose the hidden links between pirates of the Main Belt and Rear Admiral Parwan, the TCN sector commander for Vesta.

Agneta Braun: 37 y.o., 176 cm, 64 kg, blonde, blue eyes, beautiful and single. **Top aide and confidante of Karl Langemann**. Highly intelligent, resolute and decisive. Is a martial artist expert, a good shot with a pistol and has a degree in business and space commerce, plus a degree in human behaviour and psychology.

MSS KOSTROMA

- Civilian space container ship. Commissioned in 2289 at the Jovian Shipbuilding Corporation shipyards on Callisto. Belonged until February 2315 to James Forster, who was also her captain. James Forster, on his death bed, left the KOSTROMA to his niece and ship's pilot, Tina. The MSS KOSTROMA, while fully owned by Tina Forster, normally gets its cargo/passenger manifest from the Jovian Shipping Lines, based on Callisto. Usually runs the Jupiter-Earth-Mars return route.

- Length overall of 1,260 meters; max diameter (at aft gravity sail) of 370 metres. Empty ship mass of 2,560,000 metric tons. Maximum authorized loaded mass of 16,000,000 metric tons. Internal tankage capacity of 2,720,000 m3 (170,000 metric tons) of cryogenic fuel. Can add an extra 380,000 m3 (23,674 metric tons) of fuel per each external fuel pod transported. **After November 2315 refit:** Length overall of 1,700 meters (at landing legs feet); max diameter of 1,100 meters (at landing legs feet); diameter of new gravity sails= 700 meters; empty ship mass of 2,510,000 metric tons; Maximum authorized loaded mass of 24 million metric tons; internal cryogenic fuel tankage capacity of 5.6 million m3 (348,880 metric tons); eight shock-absorbing landing legs with wide feet added

(provide vertical landing capability on moons and planets with no/thin atmosphere and maximum local gravity of 0.7 G when at maximum load).

- Propelled by an ‘XT-type’ thermonuclear fusion thrust engine using cryogenic enriched deuterium-tritium hydrogen fuel. Backup ‘I-type’ fission thrust engine. Maximum sustainable main engine thrust of 25.9 million tons, with Specific Impulse of 1,300,000 seconds. Maximum acceleration of 1.6 G at normal maximum load. Able to do the Jupiter-Earth trip in five weeks in economic mode, or in two weeks at maximum performance mode. **After November 2315 refit:** Old XT-type fusion drive replaced by new XL-type Shomberg Mark VII fusion drive (max sustainable thrust of 27 million tons, aft thrust only, lighter total mass and 29% more fuel efficient than old drive). New, enlarged gravity sails at bow and stern (each of diameter of 700 meters, contains new decks (dia= 660 meters, free height=25 meters), provide greatly improved performance on gravity sails alone (0.6 G sideways acceleration at max full load, 1.1 G forward or aft acceleration at max full load); four additional fusion powerplants added in external hull add-on modules, to provide extra power for new gravity sails.

- Twenty external hardpoints along central core shaft for container pods (each 120m X 50m X 50m, capacity of 900 standard space containers, themselves each 15m X 3m X 3m), bulk liquid tanks (120m X 70m, 380,000 cubic meters capacity), customized modules or bulk ore/solids silos (120m X 50m, max 1,000,000 metric tons). Cargo space on three decks for non-standard cargo crates and 306 standard containers (max 100,000 metric tons). Extra-large modules can be carried on the south-east and south-west hardpoints (max diameter of 110 meters and max length of 800 meters). Total cargo capacity at normal maximum load is 13,270,000 metric tons, or 20,200,000 metric tons in emergency overload condition. Six external giant heavy robotic manipulator arms on sliding rails to load/unload cargo pods on external hardpoints. Cargo handling and management highly automated, with robots doing heavy handling under centralised human supervision. **After November 2315 refit:** Number of lateral external hardpoints augmented from twenty to thirty and given more depth, to allow the carrying of larger diameter loads than standard cargo pods or tanks. Stern towing point added. Aft structure under and around stern hangar reinforced and connected to landing legs trusses for added strength. Battery of aft facing tractor beam generators installed, to lift/lower single large structure (max dia of 500 meters, max height of 320 meters, max mass of 20 million metric tons).

- Internal hangars for up to twenty small craft (runabouts, light shuttles, flying repair craft) and four heavy craft (heavy shuttles, tugboat).

- Crew of 212 (minimum of 110 when no passengers on board, can be up to 280 when fully manned). Accommodations for up to 160 passengers in 60 business class cabins, plus up to 2,760 passengers in 1,200 economy class cabins. **After November 2315 refit:** Additional 600 suites built along periphery of the new forward gravity sail deck, for use by both crewmembers and passengers.

- No ship armament carried. Limited stock of small arms in case of boarding by pirates. **After November 2315 refit:** New laser beam optical channels installed between the laser fusion ignition banks and the eight new sensors turrets (4 on forward face of bow gravity sail, 4 on landing legs). These channels will provide capability for precision aimed fire by up to eight 120 MW laser beams, or four 240 MW laser beams (tuneable frequency, 30-40 cm thick laser beams) simultaneously from any of the eight sensors turrets. Also, latest models of sensors fitted (radar, lidar, I.R., U.V., radio-gonyo, radiation detectors). Plans for future fitting of heavy missiles inside some of the life pod launch tubes.