

# Ciro

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## Bulk parameters

Classification: Star, yellow dwarf  
Spectral class: G6V  
Radius: 70,980 km  
Mass:  $1.90995 \times 10^{28}$  kg  
Gravitational parameter:  $1.27471 \times 10^{18} \text{ m}^3/\text{s}^2$   
Mean density:  $12,750 \text{ kg/m}^3$   
Surface gravity: 25.8 g  
Escape velocity: 189,519 m/s  
Luminosity:  $3.34145 \times 10^{24} \text{ W}$   
Surface temperature: 5,524 K  
Planets: Icarus, Thalia, Niven, Gael, Tellumo, Gratian, Otho,  
Gauss, Nero, Hox, Leto

## Rotational parameters

Sidereal rotation period: 25 days  
Synchronous orbit altitude: 2,040,628 km  
Sphere of influence: infinity

## Atmosphere

Overall height: 1,600,000 m  
Pressure: 0.1 atm datum  
Temperature range: 4,000-10,000 K  
Mean molecular weight: 1.3 g/mol  
Composition: 90% H, 10% He

# Icarus

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 160 km datum, 161.1 km mean  
Mass:  $6.01851 \times 10^{20}$  kg  
Gravitational parameter:  $4.01680 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 34,380 kg/m<sup>3</sup>  
Surface gravity: 0.16 g datum  
Escape velocity: 709 m/s  
Bond albedo: 0.2  
Solar irradiance: 21,755 W/m<sup>2</sup>  
Black-body temperature: 526 K  
Natural satellites: none

## Orbital & rotational parameters

Semi-major axis: 3,496,090 km  
Perihelion: 3,146,481 km  
Aphelion: 3,845,699 km  
Orbit eccentricity: 0.1  
Orbit inclination: 6°  
Longitude of ascending node: 50°  
Argument of periapsis: 340°  
Sidereal orbit period: 53.259 days  
Synodic period: 60.869 days  
Mean orbital velocity: 19,095 m/s  
Sidereal rotation period: 35.506 days  
Solar day: 106.52 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 3,491 km

# Thalia

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 270 km datum, 272.5 km mean  
Mass:  $3.213050 \times 10^{21}$  kg  
Gravitational parameter:  $2.14471 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 37,900 kg/m<sup>3</sup>  
Surface gravity: 0.3 g datum  
Escape velocity: 1,260 m/s  
Bond albedo: 0.15  
Solar irradiance: 5,439 W/m<sup>2</sup>  
Black-body temperature: 378 K  
Natural satellites: Eta

## Orbital & rotational parameters

Semi-major axis: 6,992,180 km  
Perihelion: 6,922,258 km  
Aphelion: 7,062,102 km  
Orbit eccentricity: 0.01  
Orbit inclination: 3°  
Longitude of ascending node: 80°  
Argument of periapsis: 10°  
Sidereal orbit period: 150.64 days  
Synodic period: 233.05 days  
Mean orbital velocity: 13,502 m/s  
Sidereal rotation period: 20 hours  
Solar day: 20.453 hours  
Synchronous orbit altitude: 2,772 km  
Sphere of influence: 13,646 km

# Eta

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## Bulk parameters

Classification: Moon (Thalia)  
Radius: 60 km datum, 60.4 km mean  
Mass:  $2.64485 \times 10^{19}$  kg  
Gravitational parameter:  $1.76520 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 28,720 kg/m<sup>3</sup>  
Surface gravity: 0.05 g datum  
Escape velocity: 243 m/s  
Bond albedo: 0.3  
Solar irradiance: 5,439 W/m<sup>2</sup>  
Black-body temperature: 360 K

## Orbital & rotational parameters

Semi-major axis: 11,300 km  
Periapsis: 10,622 km  
Apoapsis: 11,978 km  
Orbit eccentricity: 0.06  
Orbit inclination: 2°  
Longitude of ascending node: 180°  
Argument of periapsis: 350°  
Sidereal orbit period: 23.859 days  
Synodic period: 28.350 days  
Mean orbital velocity: 138 m/s  
Sidereal rotation period: 23.859 days  
Solar day: 28.350 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,657 km

# Niven

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 400 km datum, 403.6 km mean  
Mass:  $1.17549 \times 10^{22}$  kg  
Gravitational parameter:  $7.84532 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 42,670 kg/m<sup>3</sup>  
Surface gravity: 0.5 g datum  
Escape velocity: 1,981 m/s  
Bond albedo: 0.2  
Solar irradiance: 2,417 W/m<sup>2</sup>  
Black-body temperature: 304 K  
Natural satellites: none

## Orbital & rotational parameters

Semi-major axis: 10,488,300 km  
Perihelion: 10,173,651 km  
Aphelion: 10,802,949 km  
Orbit eccentricity: 0.03  
Orbit inclination: 1°  
Longitude of ascending node: 60°  
Argument of periapsis: 0°  
Sidereal orbit period: 276.74 days  
Synodic period: 789.87 days  
Mean orbital velocity: 11,024 m/s  
Sidereal rotation period: 12 hours  
Solar day: 12.087 hours  
Synchronous orbit altitude: 2,935 km  
Sphere of influence: 34,386 km

## Atmosphere

Overall height: 65,000 m  
Pressure: 0.12 atm datum  
Mean temperature: 325 K datum  
Mean molecular weight: 43 g/mol

# Gael

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 600 km sea level, 600.4 km mean  
Mass:  $5.28971 \times 10^{22}$  kg  
Gravitational parameter:  $3.53039 \times 10^{12}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 58,330 kg/m<sup>3</sup>  
Surface gravity: 1 g sea level (9.80665 m/s<sup>2</sup>)  
Escape velocity: 3,430 m/s  
Bond albedo: 0.35  
Solar irradiance: 1,360 W/m<sup>2</sup>  
Black-body temperature: 250 K  
Natural satellites: Iota, Ceti

## Orbital & rotational parameters

Semi-major axis: 13,982,767 km (1 au)  
Perihelion: 13,982,767 km  
Aphelion: 13,982,767 km  
Orbit eccentricity: 0  
Orbit inclination: 0°  
Longitude of ascending node: n/a  
Argument of periapsis: n/a  
Sidereal orbit period: 426 days (1 year)  
Mean orbital velocity: 9,548 m/s  
Sidereal rotation period: 5.9859 hours  
Solar day: 6 hours (1 day)  
Synchronous orbit altitude: 2,862.939 km  
Sphere of influence: 83,668 km

## Atmosphere

Overall height: 70,000 m  
Pressure: 1 atm sea level (101.325 kPa)  
Mean temperature: 288 K sea level  
Mean molecular weight: 28.9644 g/mol

# Iota

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## Bulk parameters

Classification: Moon (Gael)  
Radius: 100 km datum, 101.2 km mean  
Mass:  $1.24896 \times 10^{20}$  kg  
Gravitational parameter:  $8.33565 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 28,800 kg/m<sup>3</sup>  
Surface gravity: 0.085 g datum  
Escape velocity: 408 m/s  
Bond albedo: 0.45  
Solar irradiance: 1,360 W/m<sup>2</sup>  
Black-body temperature: 240 K

## Orbital & rotational parameters

Semi-major axis: 28,000 km  
Periapsis: 28,000 km  
Apoapsis: 28,000 km  
Orbit eccentricity: 0  
Orbit inclination: 0°  
Longitude of ascending node: n/a  
Argument of periapsis: n/a  
Sidereal orbit period: 22.938 days  
Synodic period: 24.243 days  
Mean orbital velocity: 355 m/s  
Sidereal rotation period: 22.938 days  
Solar day: 24.243 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 2,491 km

# Ceti

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## Bulk parameters

Classification: Moon (Gael)  
Radius: 150 km datum, 152.5 km mean  
Mass:  $4.46319 \times 10^{20}$  kg  
Gravitational parameter:  $2.97877 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 30,030 kg/m<sup>3</sup>  
Surface gravity: 0.135 g datum  
Escape velocity: 630 m/s  
Bond albedo: 0.35  
Solar irradiance: 1,360 W/m<sup>2</sup>  
Black-body temperature: 250 K

## Orbital & rotational parameters

Semi-major axis: 55,000 km  
Periapsis: 52,250 km  
Apoapsis: 57,750 km  
Orbit eccentricity: 0.05  
Orbit inclination: 9°  
Longitude of ascending node: 90°  
Argument of periapsis: 300°  
Sidereal orbit period: 63.148 days  
Synodic period: 74.138 days  
Mean orbital velocity: 253 m/s  
Sidereal rotation period: 63.148 days  
Solar day: 74.138 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 8,144 km



# Tellumo

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 1,000 km sea level, 1,002.9 km mean  
Mass:  $2.79179 \times 10^{23}$  kg  
Gravitational parameter:  $1.86326 \times 10^{13}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 66,080 kg/m<sup>3</sup>  
Surface gravity: 1.9 g sea level  
Escape velocity: 6,105 m/s  
Bond albedo: 0.3  
Solar irradiance: 531 W/m<sup>2</sup>  
Black-body temperature: 201 K  
Natural satellites: Lili

## Orbital & rotational parameters

Semi-major axis: 22,375,000 km  
Perihelion: 21,927,500 km  
Aphelion: 22,822,500 km  
Orbit eccentricity: 0.02  
Orbit inclination: 1.5°  
Longitude of ascending node: 70°  
Argument of periapsis: 20°  
Sidereal orbit period: 862.31 days  
Synodic period: 841.93 days  
Mean orbital velocity: 7,548 m/s  
Sidereal rotation period: 16 hours  
Solar day: 16.050 hours  
Synchronous orbit altitude: 10,612 km  
Sphere of influence: 260,440 km

## Atmosphere

Overall height: 45,000 m  
Pressure: 10 atm sea level, 1 atm @ 6.75 km  
Mean temperature: 273 K sea level  
Mean molecular weight: 29 g/mol

# Lili

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## Bulk parameters

Classification: Moon (Tellumo)  
Radius: 7 km datum, 9.4 km mean  
Mass:  $1.07998 \times 10^{17}$  kg  
Gravitational parameter:  $7.20789 \times 10^6$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 30,650 kg/m<sup>3</sup>  
Surface gravity: 0.015 g datum  
Escape velocity: 45 m/s  
Bond albedo: 0.2  
Solar irradiance: 531 W/m<sup>2</sup>  
Black-body temperature: 208 K

## Orbital & rotational parameters

Semi-major axis: 1,455 km  
Perihelion: 1,455 km  
Aphelion: 1,455 km  
Orbit eccentricity: 0  
Orbit inclination: 0°  
Longitude of ascending node: n/a  
Argument of periapsis: n/a  
Sidereal orbit period: 0.7096 hours  
Synodic period: 0.7097 hours  
Mean orbital velocity: 3,579 m/s  
Sidereal rotation period: 0.7096 hours  
Solar day: 0.7097 hours  
Synchronous orbit altitude: not possible  
Sphere of influence: 40 km

***Note: Lili is omitted when Principia is installed.***

# Gratian

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 550 km datum, 552.7 km mean  
Mass:  $3.33362 \times 10^{22}$  kg  
Gravitational parameter:  $2.22488 \times 10^{12}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 47,140 kg/m<sup>3</sup>  
Surface gravity: 0.75 g datum  
Escape velocity: 2,844 m/s  
Bond albedo: 0.35  
Solar irradiance: 173 W/m<sup>2</sup>  
Black-body temperature: 149 K  
Natural satellites: Geminus

## Orbital & rotational parameters

Semi-major axis: 39,156,200 km  
Perihelion: 36,806,828 km  
Aphelion: 41,505,572 km  
Orbit eccentricity: 0.06  
Orbit inclination: 2°  
Longitude of ascending node: 100°  
Argument of periapsis: 50°  
Sidereal orbit period: 4.6861 years  
Synodic period: 541.57 days  
Mean orbital velocity: 5,706 m/s  
Sidereal rotation period: 38.679 hours  
Solar day: 38.805 hours  
Synchronous orbit altitude: 9,750 km  
Sphere of influence: 194,786 km

## Atmosphere

Overall height: 50,000 m  
Pressure: 0.5 atm datum  
Mean temperature: 157 K datum  
Mean molecular weight: 29 g/mol

# Geminus

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## Bulk parameters

Classification: Moon (Gratian)  
Radius: 230 km datum, 231.7 km mean  
Mass:  $1.71005 \times 10^{21}$  kg  
Gravitational parameter:  $1.14130 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 32,810 kg/m<sup>3</sup>  
Surface gravity: 0.22 g datum  
Escape velocity: 996 m/s  
Bond albedo: 0.35  
Solar irradiance: 173 W/m<sup>2</sup>  
Black-body temperature: 149 K

## Orbital & rotational parameters

Semi-major axis: 10,300 km  
Periapsis: 10,043 km  
Apoapsis: 10,558 km  
Orbit eccentricity: 0.025  
Orbit inclination: 3°  
Longitude of ascending node: 60°  
Argument of periapsis: 30°  
Sidereal orbit period: 6.4466 days  
Synodic period: 6.4674 days  
Mean orbital velocity: 465 m/s  
Sidereal rotation period: 6.4466 days  
Solar day: 6.4674 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 3,140 km

# Otho

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## Bulk parameters

Classification: Planet, gas giant  
Radius: 3,500 km datum  
Mass:  $1.65597 \times 10^{24}$  kg  
Gravitational parameter:  $1.10521 \times 10^{14}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 9,220 kg/m<sup>3</sup>  
Surface gravity: 0.92 g datum  
Escape velocity: 7,947 m/s  
Bond albedo: 0.4  
Solar irradiance: 50.3 W/m<sup>2</sup>  
Black-body temperature: 107 K  
Natural satellites: Augustus, Hephaestus, Jannah

## Orbital & rotational parameters

Semi-major axis: 72,718,700 km  
Perihelion: 69,809,952 km  
Aphelion: 75,627,448 km  
Orbit eccentricity: 0.04  
Orbit inclination: 1.5°  
Longitude of ascending node: 80°  
Argument of periapsis: 40°  
Sidereal orbit period: 11.860 years  
Synodic period: 465.23 days  
Mean orbital velocity: 4,187 m/s  
Sidereal rotation period: 14 hours  
Solar day: 14.006 hours  
Synchronous orbit altitude: 15,730 km  
Sphere of influence: 1,725,278 km

## Atmosphere

Overall height: 600,000 m  
Pressure: 15 atm datum, 1 atm @ 148 km  
Mean temperature: 237 K datum, 131 K @ 148 km  
Mean molecular weight: 2.4 g/mol

# Augustus

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## Bulk parameters

Classification: Moon (Otho)  
Radius: 350 km sea level, 351.6 km mean  
Mass:  $6.29990 \times 10^{21}$  kg  
Gravitational parameter:  $4.20460 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 34,600 kg/m<sup>3</sup>  
Surface gravity: 0.35 g datum  
Escape velocity: 1,550 m/s  
Bond albedo: 0.4  
Solar irradiance: 50.3 W/m<sup>2</sup>  
Black-body temperature: 107 K

## Orbital & rotational parameters

Semi-major axis: 20,000 km  
Periapsis: 19,900 km  
Apoapsis: 20,100 km  
Orbit eccentricity: 0.005  
Orbit inclination: 1°  
Longitude of ascending node: 60°  
Argument of periapsis: 60°  
Sidereal orbit period: 2.4748 days  
Synodic period: 2.4761 days  
Mean orbital velocity: 2,351 m/s  
Sidereal rotation period: 2.4748 days  
Solar day: 2.4761 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 2,153 km

## Atmosphere

Overall height: 60,000 m  
Pressure: 0.1 atm datum  
Mean temperature: 113 K datum  
Mean molecular weight: 28 g/mol

# Hephaestus

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## Bulk parameters

Classification: Moon (Otho)  
Radius: 125 km datum, 127.1 km mean  
Mass:  $1.83670 \times 10^{20}$  kg  
Gravitational parameter:  $1.22583 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 21,350 kg/m<sup>3</sup>  
Surface gravity: 0.08 g datum  
Escape velocity: 443 m/s  
Bond albedo: 0.3  
Solar irradiance: 50.3 W/m<sup>2</sup>  
Black-body temperature: 112 K

## Orbital & rotational parameters

Semi-major axis: 32,000 km  
Periapsis: 31,680 km  
Apoapsis: 32,320 km  
Orbit eccentricity: 0.01  
Orbit inclination: 0.5°  
Longitude of ascending node: 100°  
Argument of periapsis: 350°  
Sidereal orbit period: 5.0087 days  
Synodic period: 5.0137 days  
Mean orbital velocity: 1,858 m/s  
Sidereal rotation period: 5.0087 days  
Solar day: 5.0137 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 838 km

# Jannah

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## Bulk parameters

Classification: Moon (Otho)  
Radius: 105 km datum, 106.5 km mean  
Mass:  $1.05298 \times 10^{20}$  kg  
Gravitational parameter:  $7.02769 \times 10^9 \text{ m}^3/\text{s}^2$   
Mean density:  $20,790 \text{ kg/m}^3$   
Surface gravity: 0.065 g datum  
Escape velocity: 366 m/s  
Bond albedo: 0.35  
Solar irradiance:  $50.3 \text{ W/m}^2$   
Black-body temperature: 110 K

## Orbital & rotational parameters

Semi-major axis: 65,000 km  
Periapsis: 60,125 km  
Apoapsis: 69,875 km  
Orbit eccentricity: 0.075  
Orbit inclination:  $6^\circ$   
Longitude of ascending node:  $80^\circ$   
Argument of periapsis:  $70^\circ$   
Sidereal orbit period: 3.6250 days  
Synodic period: 3.6355 days  
Mean orbital velocity: 1,304 m/s  
Sidereal rotation period: 3.6250 days  
Solar day: 3.6355 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,362 km



# Gauss

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## Bulk parameters

Classification: Planet, ice giant  
Radius: 2,500 km datum  
Mass:  $9.45903 \times 10^{23}$  kg  
Gravitational parameter:  $6.31303 \times 10^{13}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 14,450 kg/m<sup>3</sup>  
Surface gravity: 1.03 g datum  
Escape velocity: 7,107 m/s  
Bond albedo: 0.45  
Solar irradiance: 13.6 W/m<sup>2</sup>  
Black-body temperature: 76 K  
Natural satellites: Loki, Catullus, Tarsiss

## Orbital & rotational parameters

Semi-major axis: 139,844,000 km  
Perihelion: 135,648,680 km  
Aphelion: 144,039,320 km  
Orbit eccentricity: 0.03  
Orbit inclination: 2°  
Longitude of ascending node: 110°  
Argument of periapsis: 340°  
Sidereal orbit period: 31.628 years  
Synodic period: 439.91 days  
Mean orbital velocity: 3,019 m/s  
Sidereal rotation period: 17 hours  
Solar day: 17.004 hours  
Synchronous orbit altitude: 15,660 km  
Sphere of influence: 2,652,003 km

## Atmosphere

Overall height: 400,000 m  
Pressure: 15 atm datum, 1 atm @ 103 km  
Mean temperature: 209 K datum, 103 K @ 103 km  
Mean molecular weight: 2.6 g/mol

# Loki

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## Bulk parameters

Classification: Moon (Gauss)  
Radius: 180 km datum, 182.7 km mean  
Mass:  $4.76074 \times 10^{20}$  kg  
Gravitational parameter:  $3.17735 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 18,640 kg/m<sup>3</sup>  
Surface gravity: 0.1 g datum  
Escape velocity: 594 m/s  
Bond albedo: 0.4  
Solar irradiance: 13.6 W/m<sup>2</sup>  
Black-body temperature: 77 K

## Orbital & rotational parameters

Semi-major axis: 18,500 km  
Periapsis: 18,130 km  
Apoapsis: 18,870 km  
Orbit eccentricity: 0.02  
Orbit inclination: 4°  
Longitude of ascending node: 130°  
Argument of periapsis: 300°  
Sidereal orbit period: 2.9132 days  
Synodic period: 2.9138 days  
Mean orbital velocity: 1,847 m/s  
Sidereal rotation period: 2.9132 days  
Solar day: 2.9138 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 887 km

# Catullus

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## Bulk parameters

Classification: Moon (Gauss)  
Radius: 1,200 km datum, 1,207.3 km mean  
Mass:  $1.90430 \times 10^{23}$  kg  
Gravitational parameter:  $1.27094 \times 10^{13}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 25,830 kg/m<sup>3</sup>  
Surface gravity: 0.9 g datum  
Escape velocity: 4,602 m/s  
Bond albedo: 0.4  
Solar irradiance: 13.6 W/m<sup>2</sup>  
Black-body temperature: 77 K

## Orbital & rotational parameters

Semi-major axis: 57,000 km  
Periapsis: 57,000 km  
Apoapsis: 57,000 km  
Orbit eccentricity: 0  
Orbit inclination: 1°  
Longitude of ascending node: 90°  
Argument of periapsis: n/a  
Sidereal orbit period: 15.755 days  
Synodic period: 15.773 days  
Mean orbital velocity: 1,052 m/s  
Sidereal rotation period: 15.755 days  
Solar day: 15.773 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 30,021 km

## Atmosphere

Overall height: 280,000 m  
Pressure: 5 atm datum, 1 atm @ 37.9 km  
Mean temperature: 95 K datum  
Mean molecular weight: 2.8 g/mol

# Tarsiss

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## Bulk parameters

Classification: Sub-moon (Catullus)  
Radius: 320 km sea level, 321.3 km mean  
Mass:  $2.55787 \times 10^{21}$  kg  
Gravitational parameter:  $1.70714 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 18,410 kg/m<sup>3</sup>  
Surface gravity: 0.17 g sea level  
Escape velocity: 1,033 m/s  
Bond albedo: 0.3  
Solar irradiance: 13.6 W/m<sup>2</sup>  
Black-body temperature: 80 K

## Orbital & rotational parameters

Semi-major axis: 6,000 km  
Periapsis: 6,000 km  
Apoapsis: 6,000 km  
Orbit eccentricity: 0  
Orbit inclination: 0°  
Longitude of ascending node: n/a  
Argument of periapsis: n/a  
Sidereal orbit period: 7.1952 hours  
Synodic period: 7.7880 hours  
Mean orbital velocity: 3,244 m/s  
Sidereal rotation period: 7.1952 hours  
Solar day: 7.7880 hours  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,070 km

## Atmosphere

Overall height: 130,000 m  
Pressure: 1.4 atm sea level  
Mean temperature: 92 K sea level  
Mean molecular weight: 27 g/mol

# Nero

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## Bulk parameters

Classification: Planet, gas giant  
Radius: 5,000 km datum  
Mass:  $3.56321 \times 10^{24}$  kg  
Gravitational parameter:  $2.37811 \times 10^{14}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 6,810 kg/m<sup>3</sup>  
Surface gravity: 0.97 g datum  
Escape velocity: 9,753 m/s  
Bond albedo: 0.5  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 53 K  
Natural satellites: Hadrian, Narisse, Muse, Minona, Agrippina, Julia

## Orbital & rotational parameters

Semi-major axis: 274,093,000 km  
Perihelion: 260,388,350 km  
Aphelion: 287,797,650 km  
Orbit eccentricity: 0.05  
Orbit inclination: 1°  
Longitude of ascending node: 90°  
Argument of periapsis: 60°  
Axial tilt: 10° with EVE, 0° without EVE  
Sidereal orbit period: 86.788 years  
Synodic period: 430.97 days  
Mean orbital velocity: 2,157 m/s  
Sidereal rotation period: 11 hours  
Solar day: 11.001 hours  
Synchronous orbit altitude: 16,139 km  
Sphere of influence: 8,835,395 km

## Atmosphere

Overall height: 560,000 m  
Pressure: 15 atm datum, 1 atm @ 152 km  
Mean temperature: 272 K datum, 104 K @ 152 km  
Mean molecular weight: 2.2 g/mol

# Hadrian

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 300 km datum, 300.8 km mean  
Mass:  $2.38037 \times 10^{21}$  kg  
Gravitational parameter:  $1.58868 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 20,890 kg/m<sup>3</sup>  
Surface gravity: 0.18 g datum  
Escape velocity: 1,029 m/s  
Bond albedo: 0.2  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 59 K

## Orbital & rotational parameters

Semi-major axis: 30,000 km  
Periapsis: 29,700 km  
Apoapsis: 30,300 km  
Orbit eccentricity: 0.01  
Orbit inclination: 10°, 0.52° to equator  
Longitude of ascending node: 357°  
Argument of periapsis: 145°  
Sidereal orbit period: 3.0995 days  
Synodic period: 3.0998 days  
Mean orbital velocity: 2,816 m/s  
Sidereal rotation period: 3.0995 days  
Solar day: 3.0998 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,611 km

## Atmosphere

Overall height: 80,000 m  
Pressure: 0.4 atm sea level  
Mean temperature: 65 K sea level  
Mean molecular weight: 28 g/mol

# Narisse

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 90 km datum, 90.5 km mean  
Mass:  $4.76074 \times 10^{19}$  kg  
Gravitational parameter:  $3.17735 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 15,360 kg/m<sup>3</sup>  
Surface gravity: 0.04 g datum  
Escape velocity: 266 m/s  
Bond albedo: 0.45  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 54 K

## Orbital & rotational parameters

Semi-major axis: 48,000 km  
Periapsis: 47,280 km  
Apoapsis: 48,720 km  
Orbit eccentricity: 0.015  
Orbit inclination: 10.85°, 1.01° to equator  
Longitude of ascending node: 3°  
Argument of periapsis: 115°  
Sidereal orbit period: 6.2729 days  
Synodic period: 6.2740 days  
Mean orbital velocity: 2,226 m/s  
Sidereal rotation period: 6.2729 days  
Solar day: 6.2740 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 539 km

# Muse

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 130 km datum, 131.5 km mean  
Mass:  $1.98658 \times 10^{20}$  kg  
Gravitational parameter:  $1.32586 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 20,870 kg/m<sup>3</sup>  
Surface gravity: 0.08 g datum  
Escape velocity: 452 m/s  
Bond albedo: 0.35  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 56 K

## Orbital & rotational parameters

Semi-major axis: 80,000 km  
Periapsis: 79,600 km  
Apoapsis: 80,400 km  
Orbit eccentricity: 0.005  
Orbit inclination: 10.25°, 0.25° to equator  
Longitude of ascending node: 0°  
Argument of periapsis: 180°  
Sidereal orbit period: 13.497 days  
Synodic period: 13.502 days  
Mean orbital velocity: 1,724 m/s  
Sidereal rotation period: 13.497 days  
Solar day: 13.502 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,591 km



# Minona

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 120 km datum, 121.4 km mean  
Mass:  $1.26953 \times 10^{20}$  kg  
Gravitational parameter:  $8.47295 \times 10^9 \text{ m}^3/\text{s}^2$   
Mean density:  $16,920 \text{ kg/m}^3$   
Surface gravity: 0.06 g datum  
Escape velocity: 376 m/s  
Bond albedo: 0.35  
Solar irradiance:  $3.54 \text{ W/m}^2$   
Black-body temperature: 56 K

## Orbital & rotational parameters

Semi-major axis: 135,000 km  
Periapsis: 132,300 km  
Apoapsis: 137,700 km  
Orbit eccentricity: 0.02  
Orbit inclination:  $11^\circ$ ,  $1.48^\circ$  to equator  
Longitude of ascending node:  $6^\circ$   
Argument of periapsis:  $155^\circ$   
Sidereal orbit period: 29.588 days  
Synodic period: 29.611 days  
Mean orbital velocity: 1,327 m/s  
Sidereal rotation period: 29.588 days  
Solar day: 29.611 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 2,244 km

# Agrippina

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 50 km datum, 50.3 km mean  
Mass:  $1.10202 \times 10^{19}$  kg  
Gravitational parameter:  $7.35499 \times 10^8$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 20,720 kg/m<sup>3</sup>  
Surface gravity: 0.03 g datum  
Escape velocity: 172 m/s  
Bond albedo: 0.45  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 54 K

## Orbital & rotational parameters

Semi-major axis: 800,000 km  
Periapsis: 672,000 km  
Apoapsis: 928,000 km  
Orbit eccentricity: 0.16  
Orbit inclination: 18°, 27.1° to equator  
Longitude of ascending node: 150°  
Argument of periapsis: 60°  
Sidereal orbit period: 426.82 days  
Synodic period: 431.81 days  
Mean orbital velocity: 545 m/s  
Sidereal rotation period: 8 hours  
Solar day: 8.0003 hours  
Synchronous orbit altitude: 199 km  
Sphere of influence: 5,003 km

# Julia

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## Bulk parameters

Classification: Moon (Nero)  
Radius: 30 km datum, 30.2 km mean  
Mass:  $1.98364 \times 10^{18}$  kg  
Gravitational parameter:  $1.32390 \times 10^8$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 17,150 kg/m<sup>3</sup>  
Surface gravity: 0.015 g datum  
Escape velocity: 94 m/s  
Bond albedo: 0.4  
Solar irradiance: 3.54 W/m<sup>2</sup>  
Black-body temperature: 55 K

## Orbital & rotational parameters

Semi-major axis: 1,625,000 km  
Periapsis: 1,170,000 km  
Apoapsis: 2,080,000 km  
Orbit eccentricity: 0.28  
Orbit inclination: 170°, 160° to equator  
Longitude of ascending node: 0°  
Argument of periapsis: 60°  
Sidereal orbit period: 2.9006 years  
Synodic period: 3.0008 years  
Mean orbital velocity: 383 m/s  
Sidereal rotation period: 10 hours  
Solar day: 10.0005 hours  
Synchronous orbit altitude: 133 km  
Sphere of influence: 5,118 km

# Hox

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## Bulk parameters

Classification: Planet, ice  
Radius: 250 km datum, 252.3 km mean  
Mass:  $1.28569 \times 10^{21}$  kg  
Gravitational parameter:  $8.58082 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 19,120 kg/m<sup>3</sup>  
Surface gravity: 0.14 g datum  
Escape velocity: 829 m/s  
Bond albedo: 0.4  
Solar irradiance: 1.51 W/m<sup>2</sup>  
Black-body temperature: 45 K  
Natural satellites: Argo

## Orbital & rotational parameters

Semi-major axis: 419,531,000 km  
Perihelion: 356,601,350 km  
Aphelion: 482,460,650 km  
Orbit eccentricity: 0.15  
Orbit inclination: 5°  
Longitude of ascending node: 120°  
Argument of periapsis: 90°  
Sidereal orbit period: 164.34 years  
Synodic period: 428.61 days  
Mean orbital velocity: 1,743 m/s  
Sidereal rotation period: 18 hours  
Solar day: 18.001 hours  
Synchronous orbit altitude: 1,840 km  
Sphere of influence: 567,558 km

## Atmosphere

Overall height: 40,000 m  
Pressure: 0.01 atm datum  
Mean temperature: 46 K datum  
Mean molecular weight: 28 g/mol

# Argo

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## Bulk parameters

Classification: Moon (Hox)  
Radius: 80 km datum, 81.0 km mean  
Mass:  $3.29137 \times 10^{19}$  kg  
Gravitational parameter:  $2.19669 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 14,790 kg/m<sup>3</sup>  
Surface gravity: 0.035 g datum  
Escape velocity: 234 m/s  
Bond albedo: 0.6  
Solar irradiance: 1.51 W/m<sup>2</sup>  
Black-body temperature: 40 K

## Orbital & rotational parameters

Semi-major axis: 12,500 km  
Periapsis: 12,500 km  
Apoapsis: 12,500 km  
Orbit eccentricity: 0  
Orbit inclination: 40°  
Longitude of ascending node: 90°  
Argument of periapsis: n/a  
Sidereal orbit period: 43.886 days  
Synodic period: 43.914 days  
Mean orbital velocity: 83 m/s  
Sidereal rotation period: 43.886 days  
Solar day: 43.914 days  
Synchronous orbit altitude: not possible  
Sphere of influence: 2,885 km

# Leto

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## Bulk parameters

Classification: Planet, ice  
Radius: 210 km datum, 211.5 km mean  
Mass:  $7.77587 \times 10^{20}$  kg  
Gravitational parameter:  $5.18968 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 19,630 kg/m<sup>3</sup>  
Surface gravity: 0.12 g datum  
Escape velocity: 703 m/s  
Bond albedo: 0.65  
Solar irradiance: 0.90 W/m<sup>2</sup>  
Black-body temperature: 34 K  
Natural satellites: none

## Orbital & rotational parameters

Semi-major axis: 542,593,000 km  
Perihelion: 488,333,700 km  
Aphelion: 596,852,300 km  
Orbit eccentricity: 0.1  
Orbit inclination: 10°  
Longitude of ascending node: 100°  
Argument of periapsis: 80°  
Sidereal orbit period: 241.73 years  
Synodic period: 427.77 days  
Mean orbital velocity: 1,533 m/s  
Sidereal rotation period: 6 hours  
Solar day: 6.0001 hours  
Synchronous orbit altitude: 640 km  
Sphere of influence: 600,296 km

## Atmosphere

Overall height: 35,000 m  
Pressure: 0.005 atm datum  
Mean temperature: 36 K datum  
Mean molecular weight: 28 g/mol

# Grannus

---

## Bulk parameters

Classification: Star, red dwarf  
Spectral class: M2V  
Radius: 30,170 km  
Mass:  $9.54944 \times 10^{27}$  kg  
Gravitational parameter:  $6.37338 \times 10^{17} \text{ m}^3/\text{s}^2$   
Mean density: 83,020 kg/m<sup>3</sup>  
Surface gravity: 71.4 g  
Escape velocity: 205,547 m/s  
Luminosity:  $1.03012 \times 10^{23}$  W  
Surface temperature: 3,550 K  
Planets: none without GEP, 5 with GEP

## Orbital & rotational parameters

Semi-major axis: 2,000,000,000 km (1,500,000,000 km with OPM)  
Perihelion: 1,200,000,000 km  
Aphelion: 2,800,000,000 km (1,800,000,000 km with OPM)  
Orbit eccentricity: 0.4 (0.2 with OPM)  
Orbit inclination: 7°  
Longitude of ascending node: 130°  
Argument of periapsis: 20°  
Sidereal orbit period: 1711.6 years (1111.1 years with OPM)  
Mean orbital velocity: 798 m/s (922 m/s with OPM)  
Sidereal rotation period: 60 days  
Synchronous orbit altitude: 2,974,107 km  
Sphere of influence: 500,000,000 km

## Atmosphere

Overall height: 400,000 m  
Pressure: 0.1 atm datum  
Temperature range: 2,600-6,000 K  
Mean molecular weight: 1.3 g/mol

# Robau's Star (requires OPM)

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## Bulk parameters

Classification: Star, orange dwarf  
Spectral class: K5V  
Radius: 49,360 km  
Mass:  $1.43199 \times 10^{28}$  kg  
Gravitational parameter:  $9.55721 \times 10^{17}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 28,430 kg/m<sup>3</sup>  
Surface gravity: 40.0 g  
Escape velocity: 196,785 m/s  
Luminosity:  $6.80791 \times 10^{23}$  W  
Surface temperature: 4,450 K  
Planets: 4 with OPM

## Orbital & rotational parameters

Semi-major axis: 4,800,000,000 km  
Perihelion: 4,320,000,000 km  
Aphelion: 5,280,000,000 km  
Orbit eccentricity: 0.1  
Orbit inclination: 10°  
Longitude of ascending node: 60°  
Argument of periapsis: 45°  
Sidereal orbit period: 6360.2 years  
Mean orbital velocity: 515 m/s  
Sidereal rotation period: 40 days  
Synchronous orbit altitude: 2,574,856 km  
Sphere of influence: 2,000,000,000 km

## Atmosphere

Overall height: 900,000 m  
Pressure: 0.1 atm datum  
Temperature range: 3,250-8,000 K  
Mean molecular weight: 1.3 g/mol