

# Grannus

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## Bulk parameters

Classification: Star, red-dwarf  
Spectral class: M2V  
Radius: 30,170 km  
Mass:  $9.54944 \times 10^{27}$  kg  
Gravitational parameter:  $6.37338 \times 10^{17}$  m<sup>3</sup>/s<sup>2</sup>  
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  
Absolute magnitude: +8.7  
Surface temperature: 3,550 K  
Planets: Taranis, Toutatis, Nodens, Sucellus, Sirona, Epona, Cernunnos

## Orbital & rotational parameters

Semimajor axis: 2,000,000,000 km  
Perihelion: 1,200,000,000 km  
Aphelion: 2,800,000,000 km  
Orbit eccentricity: 0.4  
Orbit inclination: 7°  
Longitude of ascending node: 130°  
Argument of periapsis: 20°  
Sidereal orbit period: 1,710.6 years  
Mean orbital velocity: 798 m/s  
Sidereal rotation period: 360 hours  
Synchronous orbit altitude: 2,974,107 km  
Sphere of influence: 500,000,000 km

## Atmosphere

Overall height: 300,000 m  
Pressure: 0.1 atm datum  
Temperature range: 2,520-5,790 K  
Mean molecular weight: 1.277 g/mol  
Composition: 91% H, 9% He

# Taranis

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 200 km sea level, 203.2 km mean  
Mass:  $1.17549 \times 10^{21}$  kg  
Gravitational parameter:  $7.84532 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 33,430 kg/m<sup>3</sup>  
Surface gravity: 0.2 g  
Escape velocity: 886 m/s  
Bond albedo: 0.2  
Solar irradiance: 121,260 W/m<sup>2</sup>  
Black-body temperature: 962 K sunlit side  
Natural satellites: none

## Orbital & rotational parameters

Semimajor axis: 260,000 km  
Perihelion: 252,200 km  
Aphelion: 267,800 km  
Orbit eccentricity: 0.03  
Orbit inclination: 9°, 2.66° to ecliptic  
Longitude of ascending node: 140°  
Argument of periapsis: 345°  
Sidereal orbit period: 9.6154 hours  
Mean orbital velocity: 49,511 m/s  
Sidereal rotation period: 9.6154 hours  
Solar day: tidal locked  
Obliquity to orbit: 9°  
Synchronous orbit altitude: not possible  
Sphere of influence: 448 km

# Toutatis

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 350 km datum, 352.8 km mean  
Mass:  $8.09987 \times 10^{21}$  kg  
Gravitational parameter:  $5.40592 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 44,020 kg/m<sup>3</sup>  
Surface gravity: 0.45 g  
Escape velocity: 1,758 m/s  
Bond albedo: 0.22  
Solar irradiance: 2,634 W/m<sup>2</sup>  
Black-body temperature: 367 K sunlit side  
Natural satellites: none

## Orbital & rotational parameters

Semimajor axis: 1,764,200 km  
Perihelion: 1,737,737 km  
Aphelion: 1,790,663 km  
Orbit eccentricity: 0.015  
Orbit inclination: 10.5°, 1.02° to ecliptic  
Longitude of ascending node: 160°  
Argument of periapsis: 300°  
Sidereal orbit period: 27.000 days  
Mean orbital velocity: 19,007 m/s  
Sidereal rotation period: 27.000 days  
Solar day: tidal locked  
Obliquity to orbit: 10.5°  
Synchronous orbit altitude: not possible  
Sphere of influence: 5,591 km

## Atmosphere

Overall height: 65,000 m  
Pressure: 0.04 atm datum  
Mean temperature: 404 K sunlit side, 275 K dark side  
Mean molecular weight: 43.33 g/mol  
Composition: 95% CO<sub>2</sub>, 4% N<sub>2</sub>, 1% Ar

# Nodens

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## Bulk parameters

Classification: Planet, terrestrial  
Radius: 700 km sea level, 701.5 km mean  
Mass:  $7.91987 \times 10^{22}$  kg  
Gravitational parameter:  $5.28578 \times 10^{12}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 54,770 kg/m<sup>3</sup>  
Surface gravity: 1.1 g  
Escape velocity: 3,886 m/s  
Bond albedo: 0.3  
Solar irradiance: 1,333 W/m<sup>2</sup>  
Black-body temperature: 253 K  
Natural satellites: Belisama

## Orbital & rotational parameters

Semimajor axis: 2,479,976 km  
Perihelion: 2,430,376 km  
Aphelion: 2,529,575 km  
Orbit eccentricity: 0.02  
Orbit inclination: 10°, 0° to ecliptic  
Longitude of ascending node: 155°  
Argument of periapsis: 30°  
Sidereal orbit period: 45.000 days  
Mean orbital velocity: 16,031 m/s  
Sidereal rotation period: 67.500 hours  
Solar day: 90.000 hours  
Obliquity to orbit: 10°  
Synchronous orbit altitude: 19,221 km  
Sphere of influence: 23,011 km

## Atmosphere

Overall height: 70,000 m  
Pressure: 2 atm sea level  
Mean temperature: 294 K sea level  
Mean molecular weight: 28.69 g/mol  
Composition: 84% N<sub>2</sub>, 15% O<sub>2</sub>, 0.5% Ar, 0.25% CO<sub>2</sub>, 0.25% H<sub>2</sub>O

# Belisama

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## Bulk parameters

Classification: Moon (Nodens)  
Radius: 250 km datum, 254.2 km mean  
Mass:  $2.47955 \times 10^{21}$  kg  
Gravitational parameter:  $1.65487 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 36,050 kg/m<sup>3</sup>  
Surface gravity: 0.27 g  
Escape velocity: 1,151 m/s  
Bond albedo: 0.25  
Solar irradiance: 1,333 W/m<sup>2</sup>  
Black-body temperature: 258 K

## Orbital & rotational parameters

Semimajor axis: 19,921 km  
Perihelion: 19,423 km  
Aphelion: 20,419 km  
Orbit eccentricity: 0.025  
Orbit inclination: 9.5°, 3.41° to ecliptic  
Longitude of ascending node: 135°  
Argument of periapsis: 165°  
Sidereal orbit period: 11.250 days  
Synodic period: 15.000 days  
Mean orbital velocity: 515 m/s  
Sidereal rotation period: 67.500 hours  
Solar day: 90.000 hours  
Obliquity to orbit: 9.5°  
Synchronous orbit altitude: not possible  
Sphere of influence: 4,984 km

# Sucellus

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## Bulk parameters

Classification: Dwarf planet  
Radius: 150 km datum, 153.1 km mean  
Mass:  $4.62850 \times 10^{20}$  kg  
Gravitational parameter:  $3.08909 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 30,790 kg/m<sup>3</sup>  
Surface gravity: 0.14 g  
Escape velocity: 642 m/s  
Bond albedo: 0.2  
Solar irradiance: 236 W/m<sup>2</sup>  
Black-body temperature: 170 K  
Natural satellites: Caireen

## Orbital & rotational parameters

Semimajor axis: 5,897,000 km  
Perihelion: 5,366,270 km  
Aphelion: 6,427,730 km  
Orbit eccentricity: 0.09  
Orbit inclination: 7°, 3.71° to ecliptic  
Longitude of ascending node: 170°  
Argument of periapsis: 45°  
Sidereal orbit period: 165.00 days  
Mean orbital velocity: 10,396 m/s  
Sidereal rotation period: 8.000 hours  
Solar day: 8.065 hours  
Obliquity to orbit: 7°  
Synchronous orbit altitude: 715.8 km  
Sphere of influence: 6,999 km

# Caireen

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## Bulk parameters

Classification: Moon (Sucellus)  
Radius: 30 km datum, 31.8 mean  
Mass:  $2.64485 \times 10^{18}$  kg  
Gravitational parameter:  $1.76520 \times 10^8$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 19,580 kg/m<sup>3</sup>  
Surface gravity: 0.02 g  
Escape velocity: 108 m/s  
Bond albedo: 0.22  
Solar irradiance: 236 W/m<sup>2</sup>  
Black-body temperature: 169 K

## Orbital & rotational parameters

Semimajor axis: 4,700 km  
Perihelion: 4,583 km  
Aphelion: 4,818 km  
Orbit eccentricity: 0.025  
Orbit inclination: 5.5°, 6.77° to ecliptic  
Longitude of ascending node: 195°  
Argument of periapsis: 75°  
Sidereal orbit period: 16.864 days  
Synodic period: 18.782 days  
Mean orbital velocity: 81 m/s  
Sidereal rotation period: 101.18 hours  
Solar day: 112.69 hours  
Obliquity to orbit: 5.5°  
Synchronous orbit altitude: not possible  
Sphere of influence: 596 km

# Sirona

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## Bulk parameters

Classification: Planet, gas giant  
Radius: 3,000 km datum  
Mass:  $1.32243 \times 10^{24}$  kg  
Gravitational parameter:  $8.825985 \times 10^{13} \text{ m}^3/\text{s}^2$   
Mean density:  $11,690 \text{ kg/m}^3$   
Surface gravity: 1 g  
Escape velocity: 7,671 m/s  
Bond albedo: 0.4  
Solar irradiance:  $57.9 \text{ W/m}^2$   
Black-body temperature: 111 K  
Natural satellites: Airmed, Brovo, Damona

## Orbital & rotational parameters

Semimajor axis: 11,900,000 km  
Perihelion: 11,424,000 km  
Aphelion: 12,376,000 km  
Orbit eccentricity: 0.04  
Orbit inclination:  $10^\circ$ ,  $0.87^\circ$  to ecliptic  
Longitude of ascending node:  $150^\circ$   
Argument of periapsis:  $0^\circ$   
Sidereal orbit period: 473.00 days  
Mean orbital velocity: 7,318 m/s  
Sidereal rotation period: 6.000 hours  
Solar day: 6.013 hours  
Obliquity to orbit:  $10^\circ$   
Synchronous orbit altitude: 16,502 km  
Sphere of influence: 340,490 km

## Atmosphere

Overall height: 320,000 m  
Pressure: 100 atm datum, 1 atm @ 87.1 km  
Mean temperature: 456 K datum, 147 K @ 87.1 km  
Mean molecular weight: 2.594 g/mol  
Composition: 83%  $\text{H}_2$ , 15% He, 2%  $\text{CH}_4$



# Airmed

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## Bulk parameters

Classification: Moon (Sirona)  
Radius: 160 km datum, 163.1 km mean  
Mass:  $5.64236 \times 10^{20}$  kg  
Gravitational parameter:  $3.76575 \times 10^{10}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 31,030 kg/m<sup>3</sup>  
Surface gravity: 0.15 g  
Escape velocity: 686 m/s  
Bond albedo: 0.2  
Solar irradiance: 57.9 W/m<sup>2</sup>  
Black-body temperature: 120 K

## Orbital & rotational parameters

Semimajor axis: 35,000 km  
Perihelion: 34,650 km  
Aphelion: 35,350 km  
Orbit eccentricity: 0.01  
Orbit inclination: 1°, 9.20° to ecliptic  
Longitude of ascending node: 120°  
Argument of periapsis: 90°  
Sidereal orbit period: 6.4113 days  
Synodic period: 6.4994 days  
Mean orbital velocity: 1,588 m/s  
Sidereal rotation period: 38.468 hours  
Solar day: 38.996 hours  
Obliquity to orbit: 1°  
Synchronous orbit altitude: not possible  
Sphere of influence: 1,571 km

# Brovo

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## Bulk parameters

Classification: Moon (Sirona)  
Radius: 300 km datum, 303.6 km mean  
Mass:  $4.62850 \times 10^{21}$  kg  
Gravitational parameter:  $3.08909 \times 10^{11}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 39,500 kg/m<sup>3</sup>  
Surface gravity: 0.35 g  
Escape velocity: 1,435 m/s  
Bond albedo: 0.27  
Solar irradiance: 57.9 W/m<sup>2</sup>  
Black-body temperature: 117 K

## Orbital & rotational parameters

Semimajor axis: 70,000 km  
Perihelion: 68,600 km  
Aphelion: 71,400 km  
Orbit eccentricity: 0.02  
Orbit inclination: 0.5°, 9.50° to ecliptic  
Longitude of ascending node: 150°  
Argument of periapsis: 30°  
Sidereal orbit period: 18.134 days  
Synodic period: 18.857 days  
Mean orbital velocity: 1,123 m/s  
Sidereal rotation period: 108.80 hours  
Solar day: 113.14 hours  
Obliquity to orbit: 0.5°  
Synchronous orbit altitude: not possible  
Sphere of influence: 7,290 km

## Atmosphere

Overall height: 65,000 m  
Pressure: 0.15 atm datum  
Mean temperature: 132 K datum  
Mean molecular weight: 27.89 g/mol  
Composition: 97% N<sub>2</sub>, 2% CH<sub>4</sub>, 1% Ar

# Damona

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## Bulk parameters

Classification: Moon (Sirona)  
Radius: 80 km datum, 83.1 km mean  
Mass:  $5.64236 \times 10^{19}$  kg  
Gravitational parameter:  $3.76575 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 23,450 kg/m<sup>3</sup>  
Surface gravity: 0.06 g  
Escape velocity: 307 m/s  
Bond albedo: 0.2  
Solar irradiance: 57.9 W/m<sup>2</sup>  
Black-body temperature: 120 K

## Orbital & rotational parameters

Semimajor axis: 120,000 km  
Perihelion: 114,000 km  
Aphelion: 126,000 km  
Orbit eccentricity: 0.05  
Orbit inclination: 4°, 8.37° to ecliptic  
Longitude of ascending node: 210°  
Argument of periapsis: 300°  
Sidereal orbit period: 40.702 days  
Synodic period: 44.534 days  
Mean orbital velocity: 858 m/s  
Sidereal rotation period: 244.21 hours  
Solar day: 267.21 hours  
Obliquity to orbit: 4°  
Synchronous orbit altitude: not possible  
Sphere of influence: 2,144 km

# Epona

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## Bulk parameters

Classification: Planet  
Radius: 500 km datum, 503.9 km mean  
Mass:  $2.20405 \times 10^{22}$  kg  
Gravitational parameter:  $1.47100 \times 10^{12}$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 41,130 kg/m<sup>3</sup>  
Surface gravity: 0.6 g  
Escape velocity: 2,426 m/s  
Bond albedo: 0.35  
Solar irradiance: 14.8 W/m<sup>2</sup>  
Black-body temperature: 81 K  
Natural satellites: Rosmerta, RAB-58E

## Orbital & rotational parameters

Semimajor axis: 23,500,000 km  
Perihelion: 22,090,000 km  
Aphelion: 24,910,000 km  
Orbit eccentricity: 0.06  
Orbit inclination: 11°, 2.08° to ecliptic  
Longitude of ascending node: 145°  
Argument of periapsis: 90°  
Sidereal orbit period: 3.0813 years  
Mean orbital velocity: 5,208 m/s  
Sidereal rotation period: 10.000 hours  
Solar day: 10.013 hours  
Obliquity to orbit: 11°  
Synchronous orbit altitude: 3,142 km  
Sphere of influence: 130,727 km

## Atmosphere

Overall height: 45,000 m  
Pressure: 1 atm datum  
Mean temperature: 96 K datum  
Mean molecular weight: 27.95 g/mol  
Composition: 98.5% N<sub>2</sub>, 1% CH<sub>4</sub>, 0.5% Ar

# Rosmerta

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## Bulk parameters

Classification: Moon (Epona)  
Radius: 50 km datum, 51.4 km mean  
Mass:  $1.10203 \times 10^{19}$  kg  
Gravitational parameter:  $7.35499 \times 10^8$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 19,420 kg/m<sup>3</sup>  
Surface gravity: 0.03 g  
Escape velocity: 172 m/s  
Bond albedo: 0.35  
Solar irradiance: 14.8 W/m<sup>2</sup>  
Black-body temperature: 81 K

## Orbital & rotational parameters

Semimajor axis: 17,000 km  
Perihelion: 15,810 km  
Aphelion: 18,190 km  
Orbit eccentricity: 0.07  
Orbit inclination: 6°, 5.21° to ecliptic  
Longitude of ascending node: 180°  
Argument of periapsis: 60°  
Sidereal orbit period: 16.811 days  
Synodic period: 17.029 days  
Mean orbital velocity: 294 m/s  
Sidereal rotation period: 100.87 hours  
Solar day: 102.17 hours  
Obliquity to orbit: 6°  
Synchronous orbit altitude: not possible  
Sphere of influence: 813 km

# RAB-58E

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## Bulk parameters

Classification: Moon (Epona)  
Radius: 10 km datum, 11.9 km mean  
Mass:  $1.32243 \times 10^{17}$  kg  
Gravitational parameter:  $8.82599 \times 10^6$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 18,830 kg/m<sup>3</sup>  
Surface gravity: 0.009 g  
Escape velocity: 42 m/s  
Bond albedo: 0.3  
Solar irradiance: 14.8 W/m<sup>2</sup>  
Black-body temperature: 82 K

## Orbital & rotational parameters

Semimajor axis: 90,000 km  
Perihelion: 54,000 km  
Aphelion: 126,000 km  
Orbit eccentricity: 0.4  
Orbit inclination: 160°, 161.0° to ecliptic  
Longitude of ascending node: 225°  
Argument of periapsis: 180°  
Sidereal orbit period: 204.78 days  
Synodic period: 242.63 days  
Mean orbital velocity: 128 m/s  
Sidereal rotation period: 3.000 hours  
Solar day: 3.001 hours  
Obliquity to orbit: 20°  
Synchronous orbit altitude: 25.92 km  
Sphere of influence: 734 km

# Cernunnos

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## Bulk parameters

Classification: Dwarf planet  
Radius: 120 km datum, 122.6 km mean  
Mass:  $1.48112 \times 10^{20}$  kg  
Gravitational parameter:  $9.88510 \times 10^9$  m<sup>3</sup>/s<sup>2</sup>  
Mean density: 19,200 kg/m<sup>3</sup>  
Surface gravity: 0.07 g  
Escape velocity: 406 m/s  
Bond albedo: 0.4  
Solar irradiance: 5.9 W/m<sup>2</sup>  
Black-body temperature: 63 K  
Natural satellites: none

## Orbital & rotational parameters

Semimajor axis: 37,300,000 km  
Perihelion: 30,772,500 km  
Aphelion: 43,827,500 km  
Orbit eccentricity: 0.175  
Orbit inclination: 4°, 7.10° to ecliptic  
Longitude of ascending node: 120°  
Argument of periapsis: 180°  
Sidereal orbit period: 6.1616 years  
Mean orbital velocity: 4,134 m/s  
Sidereal rotation period: 4.000 hours  
Solar day: 4.001 hours  
Obliquity to orbit: 4°  
Synchronous orbit altitude: 368.9 km  
Sphere of influence: 28,051 km

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- *Days based on Kerbin solar day of 6 hours.*
  - *Years based on Kerbin year of 426 six-hour days (2,556 hours total).*
  - *Ecliptic plane for Grannus is defined by the plane containing Nodens' orbit.*