

# Space Tracking Ontology

**IRI:**

<http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology>

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[Ontology source](#)

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## Introduction

Ontology made to organize and track astronomical objects all around the solar system and beyond

## Classes

[Aerocentric](#) [Artificial Satellite](#) [Asteroid](#) [Astronomical Object](#) [Black Hole](#)  
[Comet](#) [Dwarf Planet](#) [Geocentric](#) [Giant Planet](#) [Habitable Planet](#) [Heliocentric](#)  
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**Aerocentric<sup>C</sup>**

[back to ToC](#) or [Class ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Aerocentric>

**is equivalent to**

[Has Orbit Center](#)<sup>op</sup> **some** [Planet](#)<sup>c</sup> **and** ([Name](#)<sup>dp</sup> **value** Mars)

**has super-classes**

[Orbiter](#)<sup>c</sup>

**is disjoint with**

[Geocentric](#)<sup>c</sup>, [Heliocentric](#)<sup>c</sup>, [Lunar](#)<sup>c</sup>

An Aerocentric Orbiter is an Astronomical Object that orbits around the planet Mars

## Artificial Satellite<sup>c</sup>

back to [ToC](#) or [Class ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Artificial\\_Satellite](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Artificial_Satellite)

A man-made apparatus designed to be placed in orbit around a celestial body, generally to relay information, data etc. to Earth.

**has super-classes**

[Satellite](#)<sup>c</sup>

**is disjoint with**

[Natural Satellite](#)<sup>c</sup>

A man-made apparatus designed to be placed in orbit around a celestial body, generally to relay information, data etc. to Earth.

## Asteroid<sup>c</sup>

back to [ToC](#) or [Class ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Asteroid>

**has super-classes**

[Astronomical Object](#)<sup>c</sup>

**is disjoint with**

[Comet](#)<sup>c</sup>, [Dwarf Planet](#)<sup>c</sup>, [Natural Satellite](#)<sup>c</sup>, [Planet](#)<sup>c</sup>, [Star](#)<sup>c</sup>

Asteroids are actually minor planets which can neither be classified either as a planet or as a comet.

## Astronomical Object<sup>c</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Astronomical\\_Object](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Astronomical_Object)

**has sub-classes**

[Asteroid<sup>C</sup>](#), [Comet<sup>C</sup>](#), [Dwarf Planet<sup>C</sup>](#), [Natural Satellite<sup>C</sup>](#), [Planet<sup>C</sup>](#), [Star<sup>C</sup>](#)

is in domain of

[Has Orbit Center<sup>op</sup>](#), [Orbited By<sup>op</sup>](#), [Orbits Around<sup>op</sup>](#), [is bigger than<sup>op</sup>](#)

is in range of

[Has Orbit Center<sup>op</sup>](#), [Orbited By<sup>op</sup>](#), [Orbits Around<sup>op</sup>](#), [is bigger than<sup>op</sup>](#)

Astronomical Body is a naturally occurring physical entity, association, or structure that exists in the observable universe.

## Black Hole<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Black\\_Hole](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Black_Hole)

has super-classes

[Star<sup>C</sup>](#)

is disjoint with

[Pulsar<sup>C</sup>](#), [White Dwarf<sup>C</sup>](#), [Yellow Dwarf<sup>C</sup>](#)

A black hole is a region of spacetime exhibiting gravitational acceleration so strong that nothing, no particles or even electromagnetic radiation such as light, can escape from it.

## Comet<sup>C</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Comet>

has super-classes

[Astronomical Object<sup>C</sup>](#)

is disjoint with

[Asteroid<sup>C</sup>](#), [Dwarf Planet<sup>C</sup>](#), [Natural Satellite<sup>C</sup>](#), [Planet<sup>C</sup>](#), [Star<sup>C</sup>](#)

A comet is an icy, small Solar System body that, when passing close to the Sun, warms and begins to release gases, a process called outgassing.

## Dwarf Planet<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Dwarf\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Dwarf_Planet)

has super-classes

[Astronomical Object<sup>C</sup>](#)

is disjoint with

[Asteroid<sup>C</sup>](#), [Comet<sup>C</sup>](#), [Natural Satellite<sup>C</sup>](#), [Planet<sup>C</sup>](#), [Star<sup>C</sup>](#)

A dwarf planet is a planetary-mass object that does not dominate its region of space and is not a satellite.

## Geocentric<sup>C</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Geocentric>

**is equivalent to**

[Has Orbit Center](#)<sup>op</sup> **some** [Planet](#)<sup>C</sup> **and** ([Name](#)<sup>dp</sup> **value** Earth)

**has super-classes**

[Orbiter](#)<sup>C</sup>

**is disjoint with**

[Aerocentric](#)<sup>C</sup>, [Heliocentric](#)<sup>C</sup>, [Lunar](#)<sup>C</sup>

A Geocentric Orbiter is an Astronomical Object that orbits around the planet Earth

## Giant Planet<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Giant\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Giant_Planet)

**has super-classes**

[Planet](#)<sup>C</sup>

**is disjoint with**

[Terrestrial Planet](#)<sup>C</sup>

A giant planet is any planet much larger than Earth.

## Habitable Planet<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Habitable\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Habitable_Planet)

**is equivalent to**

[Solar System Planet](#)<sup>C</sup> **and** ([Semimajor Axis](#)<sup>dp</sup> **some** )

**has super-classes**

[Solar System Planet](#)<sup>C</sup>

Habitable Planet is a planet that is able to develop and maintain environments hospitable to life.

## Heliocentric<sup>C</sup>

[back to ToC](#) or [Class ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Heliocentric>

**is defined by**

[http://stefanococomazzi.it/ontologies/space\\_tracking\\_ontology.owl](#)

**is equivalent to**

[Has Orbit Center<sup>op</sup>](#) **some** [Star<sup>C</sup>](#) **and** ([Name<sup>dp</sup>](#) **value** Sun)

**has super-classes**

[Orbiter<sup>C</sup>](#)

**is disjoint with**

[Aerocentric<sup>C</sup>](#), [Geocentric<sup>C</sup>](#), [Lunar<sup>C</sup>](#)

An Aerocentric Orbiter is an Astronomical Object that orbits around the Star Sun

## Inhabitable Planet<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Inhabitable\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Inhabitable_Planet)

**is equivalent to**

([Solar System Planet<sup>C</sup>](#) **and** ([Semimajor Axis<sup>dp</sup>](#) **some** )) **or** ([Semimajor Axis<sup>dp</sup>](#) **some** )

**has super-classes**

[Solar System Planet<sup>C</sup>](#)

Habitable Planet is a planet that is not able to develop and maintain environments hospitable to life.

## Lunar<sup>C</sup>

[back to ToC](#) or [Class ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Lunar>

**is defined by**

[http://stefanococomazzi.it/ontologies/space\\_tracking\\_ontology.owl](#)

**is equivalent to**

[Has Orbit Center<sup>op</sup>](#) **some** [Natural Satellite<sup>C</sup>](#) **and** ([Name<sup>dp</sup>](#) **value** Moon)

**has super-classes**

[Orbiter<sup>C</sup>](#)

**is disjoint with**

[Aerocentric<sup>C</sup>](#), [Geocentric<sup>C</sup>](#), [Heliocentric<sup>C</sup>](#)

a Lunar Orbiter is an Astronomical Object that orbits around the Moon

## mission destination<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission\\_Destination](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission_Destination)

participation:Event

**is in domain of**

[has participant](#)<sup>op</sup>

**is in range of**

[has mission destination](#)<sup>op</sup>, [is participant in](#)<sup>op</sup>

**has members**

[moon](#)<sup>ni</sup>

## mission object<sup>C</sup>

[back to ToC](#) or [Class ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission\\_Object](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission_Object)

participation:Object

**is in domain of**

[is participant in](#)<sup>op</sup>

**is in range of**

[has participant](#)<sup>op</sup>, [mission object participating](#)<sup>op</sup>, [role included in](#)<sup>op</sup>

## mission role<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission\\_Role](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mission_Role)

Role

**is in domain of**

[role included in](#)<sup>op</sup>

**is in range of**

[role of mission](#)<sup>op</sup>

## Natural Satellite<sup>C</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Natural\\_Satellite](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Natural_Satellite)

A Natural Satellite is an astronomical body that orbits a planet or minor planet

**has super-classes**

[Astronomical Object](#)<sup>C</sup>

[Satellite](#)<sup>C</sup>

**is disjoint with**

[Artificial Satellite](#)<sup>C</sup>, [Asteroid](#)<sup>C</sup>, [Comet](#)<sup>C</sup>, [Dwarf Planet](#)<sup>C</sup>, [Planet](#)<sup>C</sup>, [Star](#)<sup>C</sup>

## Orbiter<sup>C</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbiter>

**is equivalent to**

[Has Orbit Center](#)<sup>op</sup> **some** [Astronomical Object](#)<sup>C</sup>

**has sub-classes**

[Aerocentric](#)<sup>C</sup>, [Geocentric](#)<sup>C</sup>, [Heliocentric](#)<sup>C</sup>, [Lunar](#)<sup>C</sup>

**is in domain of**

[Semimajor Axis](#)<sup>dp</sup>

Orbiter is a thing that orbits around an astronomical body. They are defined by the astronomical body at the center of the orbit. The most common orbits are: "Geocentric", "Lunars", "Heliocentrics" and "Areocentrics".

## Planet<sup>C</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Planet>

**is defined by**

<https://www.wikidata.org/wiki/Q634>

**has super-classes**

[Astronomical Object](#)<sup>C</sup>

**has sub-classes**

[Giant Planet](#)<sup>C</sup>, [Solar System Planet](#)<sup>C</sup>, [Terrestrial Planet](#)<sup>C</sup>

**is disjoint with**

[Asteroid](#)<sup>C</sup>, [Comet](#)<sup>C</sup>, [Dwarf Planet](#)<sup>C</sup>, [Natural Satellite](#)<sup>C</sup>, [Star](#)<sup>C</sup>

## Pulsar<sup>C</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Pulsar>

**has super-classes**

[Star](#)<sup>C</sup>

**is disjoint with**

[Black Hole](#)<sup>C</sup>, [White Dwarf](#)<sup>C</sup>, [Yellow Dwarf](#)<sup>C</sup>

A pulsar is a highly magnetized rotating neutron star that emits beams of electromagnetic radiation out of its magnetic poles.

## Satellite<sup>c</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Satellite>

**is defined by**

<https://en.wiktionary.org/wiki/satellite>

A Naturale Satellite is an astronomical body that orbits a planet or minor planet

**has sub-classes**

[Artificial Satellite<sup>c</sup>](#), [Natural Satellite<sup>c</sup>](#)

**is in domain of**

[Has Orbit Center<sup>op</sup>](#)

**is in range of**

[Orbited By<sup>op</sup>](#), [Orbits Around<sup>op</sup>](#)

## Solar System Planet<sup>c</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Solar\\_System\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Solar_System_Planet)

**is equivalent to**

{ [earth](#), [mercury](#), [neptune](#), [saturn](#), [jupiter](#), [uranus](#), [venus](#), [mars](#) }

**has super-classes**

[Planet<sup>c</sup>](#)

**has sub-classes**

[Habitable Planet<sup>c</sup>](#), [Inhabitable Planet<sup>c</sup>](#)

Solar System Planet are all the planets that are in the solar system

## space mission<sup>c</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Space\\_Mission](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Space_Mission)

Participant Role

**is equivalent to**

([has mission destination<sup>op</sup>](#) **some** [mission destination<sup>c</sup>](#)) **and** ([mission object participating<sup>op</sup>](#) **some** [mission object<sup>c</sup>](#)) **and** ([role of mission<sup>op</sup>](#) **some** [mission role<sup>c</sup>](#))

**is in domain of**



[has mission destination](#)<sup>op</sup>, [mission object participating](#)<sup>op</sup>, [role of mission](#)<sup>op</sup>

## Star<sup>C</sup>

[back to ToC](#) or [Class ToC](#)

IRI: <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Star>

### has super-classes

[Astronomical Object](#)<sup>C</sup>

### has sub-classes

[Black Hole](#)<sup>C</sup>, [Pulsar](#)<sup>C</sup>, [White Dwarf](#)<sup>C</sup>, [Yellow Dwarf](#)<sup>C</sup>

### has members

[sun](#)<sup>ni</sup>

### is disjoint with

[Asteroid](#)<sup>C</sup>, [Comet](#)<sup>C</sup>, [Dwarf Planet](#)<sup>C</sup>, [Natural Satellite](#)<sup>C</sup>, [Planet](#)<sup>C</sup>

## Terrestrial Planet<sup>C</sup>

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IRI: [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Terrestrial\\_Planet](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Terrestrial_Planet)

Terrestrial Planet is a planet that is composed primarily of silicate rocks or metals.

### has super-classes

[Planet](#)<sup>C</sup>

### is disjoint with

[Giant Planet](#)<sup>C</sup>

## White Dwarf<sup>C</sup>

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IRI: [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#White\\_Dwarf](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#White_Dwarf)

### has super-classes

[Star](#)<sup>C</sup>

### is disjoint with

[Black Hole](#)<sup>C</sup>, [Pulsar](#)<sup>C</sup>, [Yellow Dwarf](#)<sup>C</sup>

A white dwarf, also called a degenerate dwarf, is a stellar core remnant composed mostly of electron-degenerate matter.

## Yellow Dwarf<sup>C</sup>

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IRI: [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Yellow\\_Dwarf](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Yellow_Dwarf)

**has super-classes**[Star<sup>c</sup>](#)**is disjoint with**[Black Hole<sup>c</sup>](#), [Pulsar<sup>c</sup>](#), [White Dwarf<sup>c</sup>](#)

A G-type main-sequence star, often called a yellow dwarf, or G dwarf star, is a main-sequence star with luminosity class V of spectral type G.

## Object Properties

[has mission destination](#)   [Has Orbit Center](#)   [has participant](#)   [is bigger than](#)  
[is participant in](#)   [is smaller than](#)   [mission destination included in](#)  
[mission object included in](#)   [mission object participating](#)   [Orbited By](#)   [Orbits Around](#)  
[role included in](#)   [role of mission](#)

### has mission destination<sup>op</sup>

[back to ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#hasMissionDestination>

**has domain**[space mission<sup>c</sup>](#)**has range**[mission destination<sup>c</sup>](#)**is inverse of**[mission destination included in<sup>op</sup>](#)

### Has Orbit Center<sup>op</sup>

[back to ToC](#) or [Object Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Has\\_Orbit\\_Center](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Has_Orbit_Center)

**has super-properties**[Orbits Around<sup>op</sup>](#)**has domain**[Astronomical Object<sup>c</sup>](#)[Satellite<sup>c</sup>](#)**has range**[Astronomical Object<sup>c</sup>](#)

### has participant<sup>op</sup>

[back to ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#hasParticipant>

**has domain**

[mission destination](#)<sup>c</sup>

**has range**

[mission object](#)<sup>c</sup>

**is inverse of**

[has participant](#)<sup>op</sup>, [has participant](#)<sup>op</sup>

**is bigger than**<sup>op</sup>

back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#isBiggerThan>

**has characteristics:** transitive

**has domain**

[Astronomical Object](#)<sup>c</sup>

**has range**

[Astronomical Object](#)<sup>c</sup>

**is inverse of**

[is smaller than](#)<sup>op</sup>

**is participant in**<sup>op</sup>

back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#isParticipantIn>

**has domain**

[mission object](#)<sup>c</sup>

**has range**

[mission destination](#)<sup>c</sup>

**is smaller than**<sup>op</sup>

back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#isSmallerThan>

**has characteristics:** transitive

**is inverse of**

[is bigger than](#)<sup>op</sup>

mission destination included in<sup>op</sup>back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#missionDestinationIncludedIn>

**has characteristics:** inverse functional

**is inverse of**

[has mission destination](#)<sup>op</sup>

mission object included in<sup>op</sup>back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#missionObjectIncludedIn>

**has characteristics:** inverse functional

**is inverse of**

[mission object participating](#)<sup>op</sup>

mission object participating<sup>op</sup>back to [ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#missionObjectParticipating>

objectParticipating

**has domain**

[space mission](#)<sup>c</sup>

**has range**

[mission object](#)<sup>c</sup>

**is inverse of**

[mission object included in](#)<sup>op</sup>

Orbited By<sup>op</sup>back to [ToC](#) or [Object Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbited\\_By](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbited_By)

**has domain**

[Astronomical Object](#)<sup>c</sup>

**has range**

[Astronomical Object](#)<sup>c</sup>

[Satellite](#)<sup>c</sup>

**is inverse of**

[Orbits Around<sup>op</sup>](#)[Orbits Around<sup>op</sup>](#)[back to ToC](#) or [Object Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbits\\_Around](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbits_Around)

**has characteristics:** transitive

**has sub-properties**

[Has Orbit Center<sup>op</sup>](#)

**has domain**

[Astronomical Object<sup>c</sup>](#)

**has range**

[Astronomical Object<sup>c</sup>](#)

[Satellite<sup>c</sup>](#)

**is inverse of**

[Orbited By<sup>op</sup>](#)

[role included in<sup>op</sup>](#)[back to ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#roleIncludedIn>

abbiamo messo questa object property funzionale perchè ogni oggetto della missione ha un solo ruolo all'interno della missione, per esempio Neil Armstrong è il comandante, ma non viceversa.

**has characteristics:** functional

**has domain**

[mission role<sup>c</sup>](#)

**has range**

[mission object<sup>c</sup>](#)

[role of mission<sup>op</sup>](#)[back to ToC](#) or [Object Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#roleOfMission>

roleOfParticipation

**has domain**

[space mission<sup>c</sup>](#)

**has range**

[mission role<sup>c</sup>](#)

## Data Properties

[Argument of Periapsis](#)
[Eccentricity](#)
[Inclination](#)
[Longitude of the ascending node](#)  
[Mass](#)
[Name](#)
[Semimajor Axis](#)
[Semimajor Axis](#)
[True Anomaly](#)

### Argument of Periapsis<sup>dp</sup>

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**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Argument\\_Of\\_Periapsis](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Argument_Of_Periapsis)

defines the orientation of the ellipse in the orbital plane, as an angle measured from the ascending node to the periapsis

#### has super-properties

[Semimajor Axis<sup>dp</sup>](#)

#### has range

double

### Eccentricity<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Eccentricity>

#### has super-properties

[Semimajor Axis<sup>dp</sup>](#)

#### has range

double

### Inclination<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Inclination>

Vertical tilt of the ellipse with respect to the reference plane, measured at the ascending node according to a reference plane

#### has super-properties

[Semimajor Axis<sup>dp</sup>](#)

#### has range

double

### Longitude of the ascending node<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Longitude\\_Of\\_The\\_Ascending\\_Node](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Longitude_Of_The_Ascending_Node)

horizontally orients the ascending node of the ellipse

**has super-properties**

[Semimajor Axis](#)<sup>dp</sup>

**has range**

double

**Mass**<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mass>

The mass of a thing expressed in Kg

**has range**

**Name**<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Name>

The attribute that identifies the name of an object

**has range**

string

**Semimajor Axis**<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbital\\_Parameter](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Orbital_Parameter)

The sum of the periapsis and apoapsis distances divided by two.

**has sub-properties**

[Argument of Periapsis](#)<sup>dp</sup>, [Eccentricity](#)<sup>dp</sup>, [Inclination](#)<sup>dp</sup>, [Longitude of the ascending node](#)<sup>dp</sup>, [Semimajor Axis](#)<sup>dp</sup>, [True Anomaly](#)<sup>dp</sup>

**has domain**

[Orbiter](#)<sup>c</sup>

**has range**

double

**Semimajor Axis**<sup>dp</sup>

[back to ToC](#) or [Data Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Semimajor\\_Axis](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Semimajor_Axis)

The sum of the periapsis and apoapsis distances divided by two.

**has super-properties**

[Semimajor Axis](#)<sup>dp</sup>

**has range**

double

## True Anomaly<sup>dp</sup>

back to [ToC](#) or [Data Property ToC](#)

**IRI:** [http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#True\\_Anomaly](http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#True_Anomaly)

defines the position of the orbiting body along the ellipse at a specific time

**has super-properties**

[Semimajor Axis](#)<sup>dp</sup>

**has range**

double

## Named Individuals

[apollo11](#) [earth](#) [jupiter](#) [mars](#) [mercury](#) [moon](#) [neptune](#) [saturn](#) [sun](#)  
[uranus](#) [venus](#)

## apollo11<sup>ni</sup>

back to [ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Apollo11>

**has facts**

[role of mission](#)<sup>op</sup> astronauta

[role of mission](#)<sup>op</sup> destinazione missione apollo11

[role of mission](#)<sup>op</sup> space shuttle

## earth<sup>ni</sup>

back to [ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Earth>

**has facts**

[Inclination](#)<sup>dp</sup> "-1.531E-5"^^double

[Longitude of the ascending node](#)<sup>dp</sup> "0.0"^^double

[Eccentricity](#)<sup>dp</sup> "0.01671123"^^double

[Semimajor Axis](#)<sup>dp</sup> "1.00000261"^^double

[Argument of Periapsis](#)<sup>dp</sup> "102.9376819"^^double



[Has Orbit Center<sup>op</sup> sun](#)

Earth is the third planet from the Sun and the only astronomical object known to harbor life. According to radiometric dating estimation and other evidence, Earth formed over 4.5 billion years ago. Earth's gravity interacts with other objects in space, especially the Sun and the Moon, which is Earth's only natural satellite.

**jupiter<sup>ni</sup>**
[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Jupiter>

**has facts**

[Eccentricity<sup>dp</sup> "0.04838624"^^double](#)

[Inclination<sup>dp</sup> "1.30439695"^^double](#)

[Longitude of the ascending node<sup>dp</sup> "100.4739091"^^double](#)

[Argument of Periapsis<sup>dp</sup> "14.72847983"^^double](#)

[Semimajor Axis<sup>dp</sup> "5.202887"^^double](#)

[Has Orbit Center<sup>op</sup> sun](#)

Jupiter is the fifth planet from the Sun and the largest in the Solar System. It is a gas giant with a mass one-thousandth that of the Sun, but two-and-a-half times that of all the other planets in the Solar System combined. Jupiter is one of the brightest objects visible to the naked eye in the night sky, and has been known to ancient civilizations since before recorded history.

**mars<sup>ni</sup>**
[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mars>

**has facts**

[Argument of Periapsis<sup>dp</sup> "-23.94362959"^^double](#)

[Eccentricity<sup>dp</sup> "0.0933941"^^double](#)

[Semimajor Axis<sup>dp</sup> "1.52371034"^^double](#)

[Inclination<sup>dp</sup> "1.84969142"^^double](#)

[Longitude of the ascending node<sup>dp</sup> "49.55953891"^^double](#)

[Has Orbit Center<sup>op</sup> sun](#)

Mars is the fourth planet from the Sun and the second-smallest planet in the Solar System, being only larger than Mercury. In English, Mars carries the name of the Roman god of war and is often referred to as the "Red Planet". The latter refers to the effect of the iron oxide prevalent on Mars' surface, which gives it a reddish appearance distinctive among the astronomical bodies visible to the naked eye. Mars is a terrestrial planet with a thin atmosphere, with surface features reminiscent of the impact craters of the Moon and the valleys, deserts and polar ice caps of Earth.

mercury<sup>ni</sup>[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Mercury>

**has facts**

[Eccentricity](#)<sup>dp</sup> "0.20563593"^^double

[Semimajor Axis](#)<sup>dp</sup> "0.38709927"^^double

[Longitude of the ascending node](#)<sup>dp</sup> "48.33076593"^^double

[Inclination](#)<sup>dp</sup> "7.00497902"^^double

[Argument of Periapsis](#)<sup>dp</sup> "77.45779628"^^double

[Has Orbit Center](#)<sup>op</sup> sun

Mercury is the smallest and innermost planet in the Solar System. Its orbit around the Sun takes 87.97 days, the shortest of all the planets in the Solar System. It is named after the Roman deity Mercury, the messenger of the gods.

moon<sup>ni</sup>[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Moon>

**belongs to**

[mission destination](#)<sup>c</sup>

**has facts**

[is smaller than](#)<sup>op</sup> earth

[Has Orbit Center](#)<sup>op</sup> earth

neptune<sup>ni</sup>[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Neptune>

**has facts**

[Eccentricity](#)<sup>dp</sup> "0.00859048"^^double

[Inclination](#)<sup>dp</sup> "1.77004347"^^double

[Longitude of the ascending node](#)<sup>dp</sup> "131.7842257"^^double

[Semimajor Axis](#)<sup>dp</sup> "30.06992276"^^double

[Argument of Periapsis](#)<sup>dp</sup> "44.96476227"^^double

[Has Orbit Center](#)<sup>op</sup> sun

Neptune is the eighth and farthest-known planet from the Sun in the Solar System. In the Solar System, it is the fourth-largest planet by diameter, the third-most-massive planet, and the densest giant planet. Neptune is 17 times the mass of Earth, slightly more massive than its near-twin Uranus. Neptune is denser and physically smaller than Uranus because its greater mass causes more gravitational compression of its atmosphere.

Neptune orbits the Sun once every 164.8 years at an average distance of 30.1 AU (4.5 billion km; 2.8 billion mi). It is named after the Roman god of the sea and has the astronomical symbol  $\Psi$ , a stylised version of the god Neptune's trident.

saturn<sup>ni</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Saturn>

#### has facts

[Eccentricity](#)<sup>dp</sup> "0.05386179"^^double

[Longitude of the ascending node](#)<sup>dp</sup> "113.6624245"^^double

[Inclination](#)<sup>dp</sup> "2.48599187"^^double

[Semimajor Axis](#)<sup>dp</sup> "9.53667594"^^double

[Argument of Periapsis](#)<sup>dp</sup> "92.59887831"^^double

[Has Orbit Center](#)<sup>op</sup> sun

Saturn is the sixth planet from the Sun and the second-largest in the Solar System, after Jupiter. It is a gas giant with an average radius of about nine times that of Earth. It only has one-eighth the average density of Earth; however, with its larger volume, Saturn is over 95 times more massive. Saturn is named after the Roman god of wealth and agriculture; its astronomical symbol ( $\hbar$ ) represents the god's sickle.

sun<sup>ni</sup>

back to [ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Sun>

#### belongs to

[Star](#)<sup>c</sup>

#### has facts

[is bigger than](#)<sup>op</sup> earth

The Sun is the star at the center of the Solar System. It is a nearly perfect sphere of hot plasma, with internal convective motion that generates a magnetic field via a dynamo process.[20] It is by far the most important source of energy for life on Earth. Its diameter is about 1.39 million kilometers (864,000 miles), or 109 times that of Earth, and its mass is about 330,000 times that of Earth. It accounts for about 99.86% of the total mass of the Solar System. Roughly three quarters of the Sun's mass consists of hydrogen (~73%); the rest is mostly helium (~25%), with much smaller quantities of heavier elements, including oxygen, carbon, neon, and iron.

uranus<sup>ni</sup>

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**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Uranus>

**has facts**[Eccentricity](#)<sup>dp</sup> "0.04725744"^^double[Inclination](#)<sup>dp</sup> "0.77263783"^^double[Argument of Periapsis](#)<sup>dp</sup> "170.9542763"^^double[Semimajor Axis](#)<sup>dp</sup> "19.18916464"^^double[Longitude of the ascending node](#)<sup>dp</sup> "74.01692503"^^double[Has Orbit Center](#)<sup>op</sup> sun

Uranus is the seventh planet from the Sun. The name "Uranus" is a reference to the Greek god of the sky, Uranus. According to Greek mythology, Uranus was the grandfather of Zeus (Jupiter) and father of Cronus (Saturn). It has the third-largest planetary radius and fourth-largest planetary mass in the Solar System. Uranus is similar in composition to Neptune, and both have bulk chemical compositions which differ from that of the larger gas giants Jupiter and Saturn. For this reason, scientists often classify Uranus and Neptune as "ice giants" to distinguish them from the gas giants.

**venus<sup>ni</sup>**[back to ToC](#) or [Named Individual ToC](#)

**IRI:** <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#Venus>

**has facts**[Eccentricity](#)<sup>dp</sup> "0.00677672"^^double[Semimajor Axis](#)<sup>dp</sup> "0.72333566"^^double[Argument of Periapsis](#)<sup>dp</sup> "131.6024672"^^double[Inclination](#)<sup>dp</sup> "3.39467605"^^double[Longitude of the ascending node](#)<sup>dp</sup> "76.67984255"^^double[Has Orbit Center](#)<sup>op</sup> sun

Venus is the second planet from the Sun. It is named after the Roman goddess of love and beauty. As the second-brightest natural object in the night sky after the Moon, Venus can cast shadows and can be, on rare occasion, visible to the naked eye in broad daylight.

## Annotation Properties

| <a href="#"><u>Creator</u></a>        | <a href="#"><u>Date</u></a>        | <a href="#"><u>Date</u></a>           | <a href="#"><u>Date</u></a>            | <a href="#"><u>description</u></a>  | <a href="#"><u>desctiption</u></a> | <a href="#"><u>has version</u></a> | <a href="#"><u>isissued</u></a> |
|---------------------------------------|------------------------------------|---------------------------------------|--|-------------------------------------|------------------------------------|------------------------------------|---------------------------------|
| <a href="#"><u>modified</u></a>       | <a href="#"><u>note</u></a>        | <a href="#"><u>Physics Symbol</u></a> | <a href="#"><u>preferred name</u></a>  | <a href="#"><u>space prefix</u></a> |                                    |                                    |                                 |
| <a href="#"><u>preferred name</u></a> | <a href="#"><u>space u r i</u></a> | <a href="#"><u>Wikidata Code</u></a>  | <a href="#"><u>Wikipedia Title</u></a> |                                     |                                    |                                    |                                 |

**Creator<sup>ap</sup>**[back to ToC](#) or [Annotation Property ToC](#)

**IRI:** <http://purl.org/dc/elements/1.1/creator>

**is defined by**

<http://purl.org/dc/elements/1.1/>

An entity primarily responsible for making the resource.

**Date**<sup>ap</sup>

back to [ToC](#) or [Annotation Property ToC](#)

**IRI:** <http://purl.org/dc/elements/1.1/date>

**is defined by**

<http://purl.org/dc/elements/1.1/>

A point or period of time associated with an event in the lifecycle of the resource.

**Date**<sup>ap</sup>

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**IRI:** <http://purl.org/dc/elements/1.1/description>

**is defined by**

<http://purl.org/dc/elements/1.1/>

A point or period of time associated with an event in the lifecycle of the resource.

**Date**<sup>ap</sup>

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**IRI:** <http://purl.org/dc/elements/1.1/title>

**is defined by**

<http://purl.org/dc/elements/1.1/>

A point or period of time associated with an event in the lifecycle of the resource.

**description**<sup>ap</sup>

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**IRI:** <http://purl.org/dc/terms/description>

**desctiption**<sup>ap</sup>

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**IRI:** <http://purl.org/dc/elements/1.1/desctiption>

**has version**<sup>ap</sup>

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**IRI:** <http://purl.org/dc/terms/hasVersion>

**isissued**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://purl.org/dc/terms/isissued>**modified**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://purl.org/dc/terms/modified>**note**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://www.w3.org/2004/02/skos/core#note>**Physics Symbol**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#physicsSymbol>

Identifies the character used in a physics formula (typically a greek letter)

**preferred name space prefix**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://purl.org/vocab/vann#preferredNameSpacePrefix>**preferred name space u r i**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://purl.org/vocab/vann#preferredNameSpaceURI>**Wikidata Code**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#wikidataCode>

Identifies the wikidata page code (useful for the API)

**Wikipedia Title**<sup>ap</sup>[back to ToC](#) or [Annotation Property ToC](#)IRI: <http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#wikipediaTitle>

Identifies the wikipedia page title (useful for the API)

## General Axioms

### All Disjoint Classes

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[Asteroid<sup>C</sup>](#), [Comet<sup>C</sup>](#), [Dwarf Planet<sup>C</sup>](#), [Natural Satellite<sup>C</sup>](#), [Planet<sup>C</sup>](#), [Star<sup>C</sup>](#)

### All Disjoint Classes

[back to ToC](#)

[Black Hole<sup>C</sup>](#), [Pulsar<sup>C</sup>](#), [White Dwarf<sup>C</sup>](#), [Yellow Dwarf<sup>C</sup>](#)

### All Disjoint Classes

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[Aerocentric<sup>C</sup>](#), [Geocentric<sup>C</sup>](#), [Heliocentric<sup>C</sup>](#), [Lunar<sup>C</sup>](#)

## Namespace Declarations

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### **default namespace**

<http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#>

### **4**

<http://www.semanticweb.org/daniele/ontologies/2020/4/>

### **dc**

<http://purl.org/dc/elements/1.1/>

### **owl**

<http://www.w3.org/2002/07/owl#>

### **rdf**

<http://www.w3.org/1999/02/22-rdf-syntax-ns#>

### **rdfs**

<http://www.w3.org/2000/01/rdf-schema#>

### **skos**

<http://www.w3.org/2004/02/skos/core#>

### **space-tracking-ontology**

<http://www.semanticweb.org/daniele/ontologies/2020/4/space-tracking-ontology#>

### **terms**

<http://purl.org/dc/terms/>

### **vann**

<http://purl.org/vocab/vann#>

### **wiki**

<https://en.wikipedia.org/wiki/>

### **xsd**

<http://www.w3.org/2001/XMLSchema#>

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