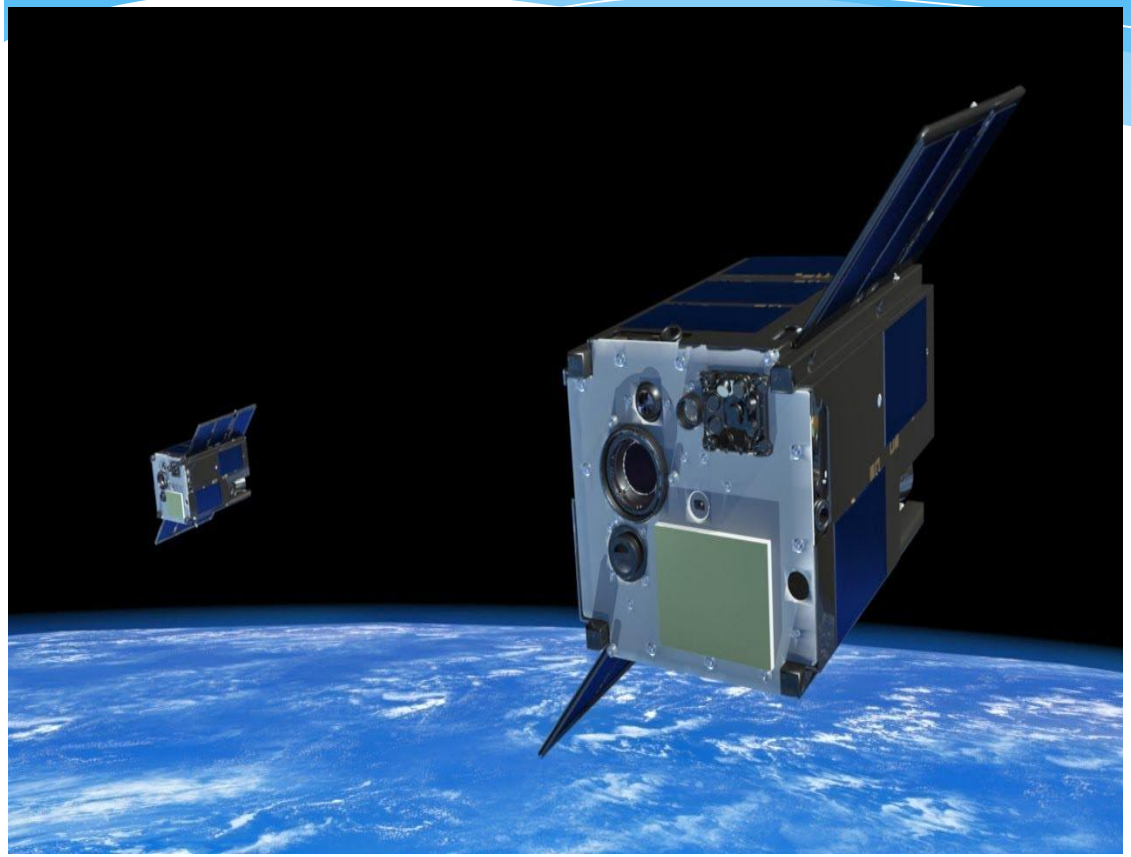
Group of small spacecrafts

Spacecraft

* A **spacecraft** is a vehicle or machine designed to fly in outer space. Spacecraft are used for a variety of purposes, including communications, earth observation, meteorology, navigation, space colonization, planetary exploration, and transportation of humans and cargo. All spacecraft except single-stage-to-orbit vehicles cannot get into space on their own, and require a launch vehicle (carrier rocket).

What a small spacecrafts

* The size and cost of spacecraft vary depending on the application; some you can hold in your hand while others like Hubble are as big as a school bus. Small spacecraft (SmallSats) focus on spacecraft with a mass less than 180 kilograms and about the size of a large kitchen fridge. Even with small spacecraft, there is a large variety of size and mass that can be differentiated



Group of small spacecrafts:

- Minisatellite, 100-180 kilograms
- Microsatellite, 10-100 kilograms
- Nanosatellite, 1-10 kilograms
- Picosatellite, 0.01-1 kilograms
- Femtosatellite, 0.001-0.01 kilograms

Minisatellite

* The term "small satellite",[2] or sometimes "minisatellite", often refers to an artificial satellite with a wet mass (including fuel) between 100 and 180 kg [5][6] but in other usage has come to mean any satellite under 180 kg [3]
*

Microsatellite

* The term "microsatellite" or "microsat" is usually applied to the name of an artificial satellite with a wet mass between 10 and 100 kg [2][5][6] However, this is not an official convention and sometimes those terms can refer to satellites larger than that, or smaller than that .[2] Sometimes designs or proposed designs from some satellites of these types have microsatellites working together or in a formation.[12] The generic term "small satellite" or "smallsat" is also sometimes used,[8] as is "satlet".[13]

Nanosatellite

* The term "nanosatellite" or "nanosat" is applied to an artificial satellite with a wet mass between 1 and 10 kg (2.2 and 22.0 lb).[2][5][6] Designs and proposed designs of these types may be launched individually, or they may have multiple nanosatellites working together or in formation, in which case, sometimes the term "satellite swarm"[20] or "fractionated spacecraft" may be applied. Some designs require a larger "mother" satellite for communication with ground controllers or for launching and docking with nanosatellites.

Picosatellite

* The term "picosatellite" or "picosat" (not to be confused with the PicoSAT series of microsatellites) is usually applied to artificial satellites with a wet mass between 0.1 and 1 kg (0.22 and 2.2 lb),[5][6] although it is sometimes used to refer to any satellite that is under 1 kg in launch mass.[2] Again, designs and proposed designs of these types usually have multiple picosatellites working together or in formation (sometimes the term "swarm" is applied). Some designs require a larger "mother" satellite for communication with ground controllers or for launching and docking with picosatellites.
The CubeSatdesign, with approximately 1 kilogram (2.2 lb) mass, is an example of a large picosatellite (or minimum nanosat).

Femtosatellite

* The term "femtosatellite" or "femtosat" is usually applied to artificial satellites with a wet mass between 10 and 100 g (0.35 and 3.5 oz).[2][5][6] Like picosatellites, some designs require a larger "mother" satellite for communication with ground controllers.
* Three prototype "chip satellites" were launched to the ISS on Space Shuttle *Endeavour* on its final mission in May 2011. They were attached to the ISS external platform Materials International Space Station Experiment (MISSE-8) for testing.[37] In March 2014, the nanosatellite KickSat was launched aboard a Falcon 9 rocket with the intention of releasing 104 femtosatellite-sized chipsats, or "Sprites".[38][39] ThumbSat is another project intending to launch femtosatellites in 2016.[40]