Staring into Space

Six decades of telescopes in orbit

We've always looked up at the night sky and searched for meaning amongst the stars. Space telescopes provide our clearest view yet, allowing us to observe the universe in new ways – uninterrupted by Earthly light pollution and atmospheric distortions. These telescopes have revealed regions where stars are born, answered questions about the origins of the universe and sent back countless images that have amazed and inspired millions.

What do the telescopes look for?

The telescopes mostly observe frequencies across the electromagnetic spectrum, but a few search for particles or long theorised, but only recently discovered, gravitational waves.

Radio
Used in conjunction with Earth based telescopes to study quasars, pulsars, and other celestial objects

Microwave
Primarily used to make observations of electromagnetic radiation left over from the early stages of the universe

Infrared
With lower energy than visible light, this allows us to see very faint objects, or things moving away from us

Visible light
Optical telescopes placed outside the distortions of our atmosphere generally provide a much better view

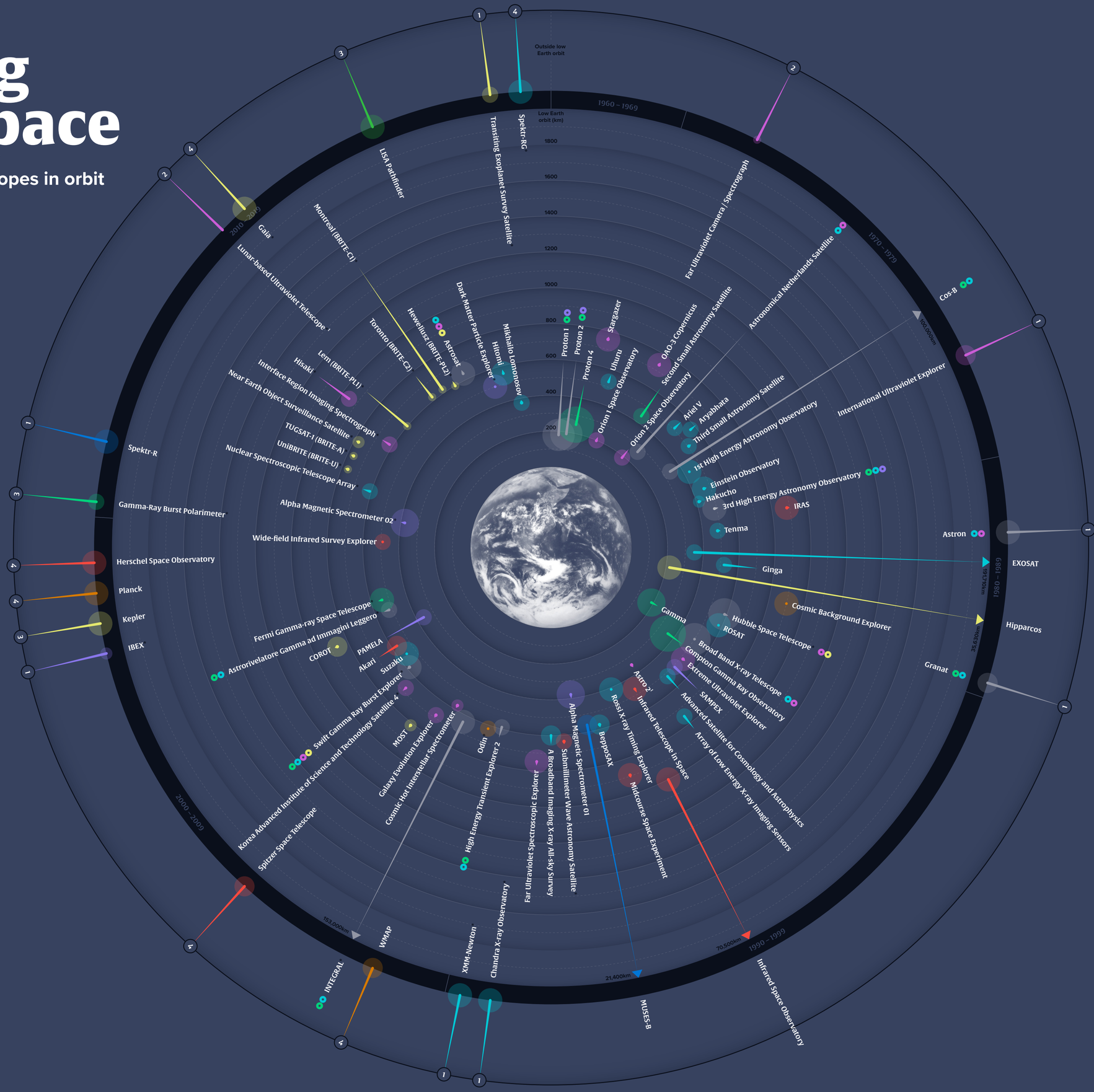
Ultraviolet
Seeing the universe in ultraviolet can teach us how galaxies evolved, as well as their chemical composition

X-Ray
This reveals high-energy photons emitted by galaxy clusters, black holes, supernova remnants and stars

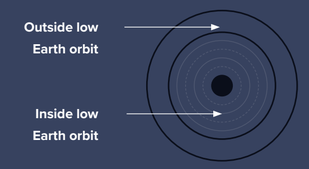
Gamma rays
These high energy frequencies are generated by supernovae, neutron stars, pulsars and black holes

Particle detection
This includes cosmic rays and electrons that are emitted by our sun, our galaxy or extragalactic sources

Gravitational waves
These are ripples in space-time generated by colliding neutron stars or black holes



The telescopes are plotted chronologically by their launch date. Spikes show orbital range, circles depict mass and colour is used to denote the type of telescope.



Telescope type
Colours depict each type (see left for details). Those with multiple types are shown in this colour with icons after the name displaying each one –

Apoapsis (km)
The max distance between the telescope and Earth. Where distance exceeds low Earth orbit an arrow is shown –

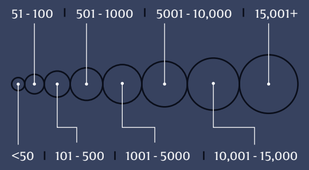
Telescope mass

Periapsis (km)
The closest distance between the telescope and Earth

Telescope name
An asterisk denotes it is still operational

Proton 1*

Telescope mass (kg)



Outside low Earth orbit

The outer part of the visualization shows those telescopes situated outside of low Earth orbit. Each one is numbered to show location.

1. **Mid / high Earth orbit**
   More than 2000km away from Earth
2. **The Moon**
   An average of 384,000km from Earth
3. **Heliocentric orbit**
   Located around the barycenter of the Solar System, near the Sun
4. **Sun-Earth L2**
   Located around 1.5 million km away, on the opposite side of Earth from the Sun

Notes and sources

Altitude is rounded to the nearest 10km.
A couple of telescopes have been omitted due to lack of data. Data from Wikipedia, NASA and ESA.
[1] Mass not available for these telescopes.
All data correct as of March 2020.

Data visualization by James Round.
See more at www.jamesrounddesign.com