SKYRORA

ABOUT SKYRORA

SKYRORA: WHO WE ARE

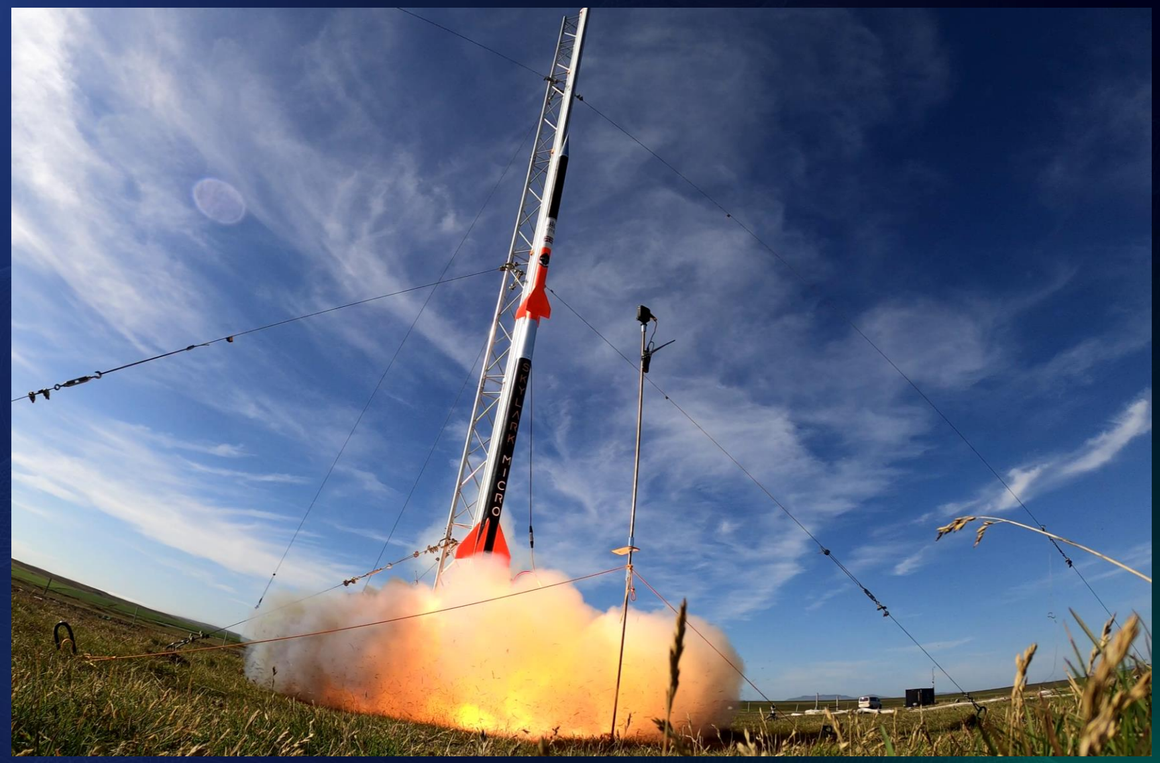
Skylark L's successful full static fire test using Skyrora's mobile launch complex in May 2020

Skyrora is headquartered in central Edinburgh, with a team of 150 employees spread across various production facilities in the UK and Europe.
cd
Skyrora have developed four suborbital rockets in order to perform real-time testing and analysis ahead of the development of the orbital vehicle, Skyrora XL.

SKYRORA: WHAT WE DO

Skyrora is a UK launch vehicle provider aiming to support government plans for space sector growth through the development of the orbital vehicle, Skyrora XL.

Understanding the importance of putting satellites into space, Skyrora have developed a rocket suite in order to eventually provide a rocket launcher to put satellites into orbit.



The launch of Skyrora's Skylark Micro vehicle from Iceland, August 2020

SATELLITES IMPROVE LIFE

WHAT IS A SATELLITE?

Galileo – a global navigation satellite system (GNSS): Marcin Janiec

A satellite is an object that moves around a larger object, which can either be natural or artificial.

Satellites have many functions, and are commonly used to take pictures of planets.

As of 1st April 2020, there were a total of 2,666 satellites in space, of which 1,918 were in low Earth Orbit (LEO).

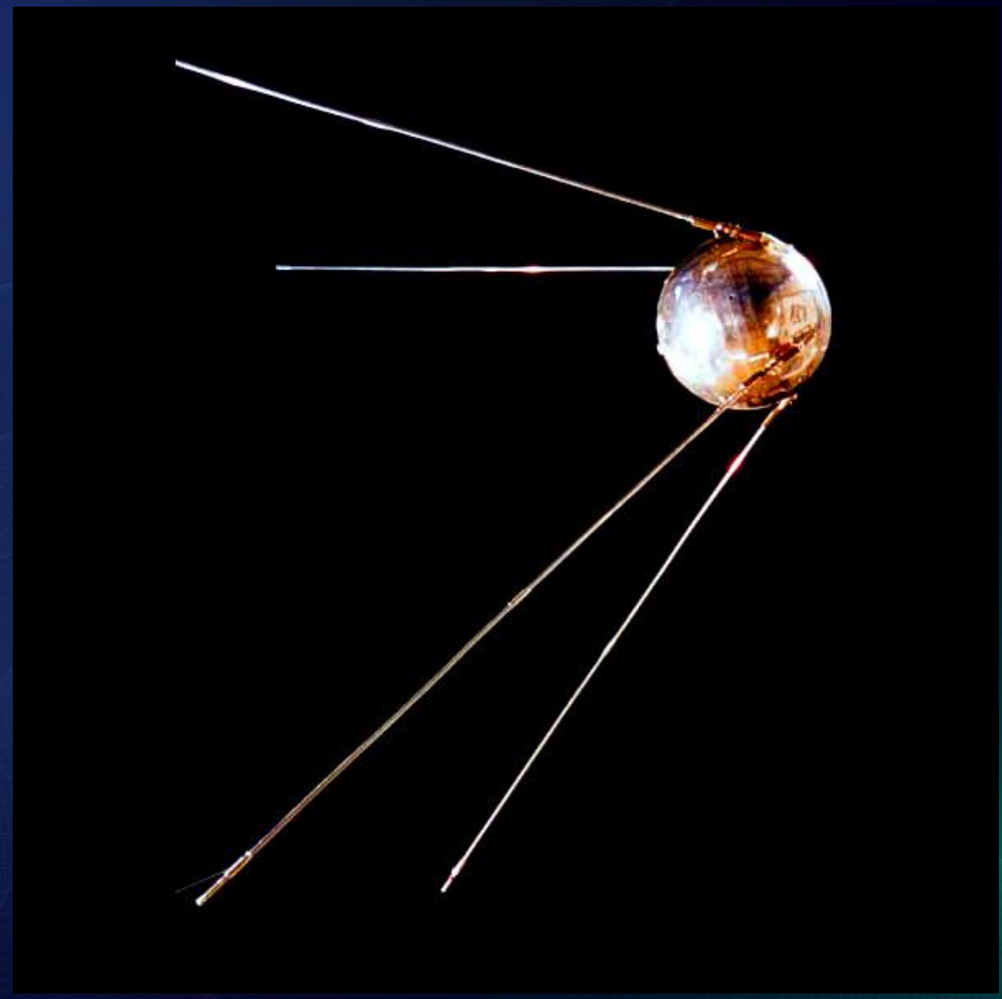
WHY ARE SATELLITES IMPORTANT?

Satellites provide information about Earth's clouds, oceans, land and air.

They also are able to observe wildfires and volcanic eruptions, and monitor smoke in the Earth's atmosphere.

This array of information assists scientists in weather prediction, climate observation, agricultural analysis, emergency response and much more.

Satellites are also able to provide masses of information about other planets and space.

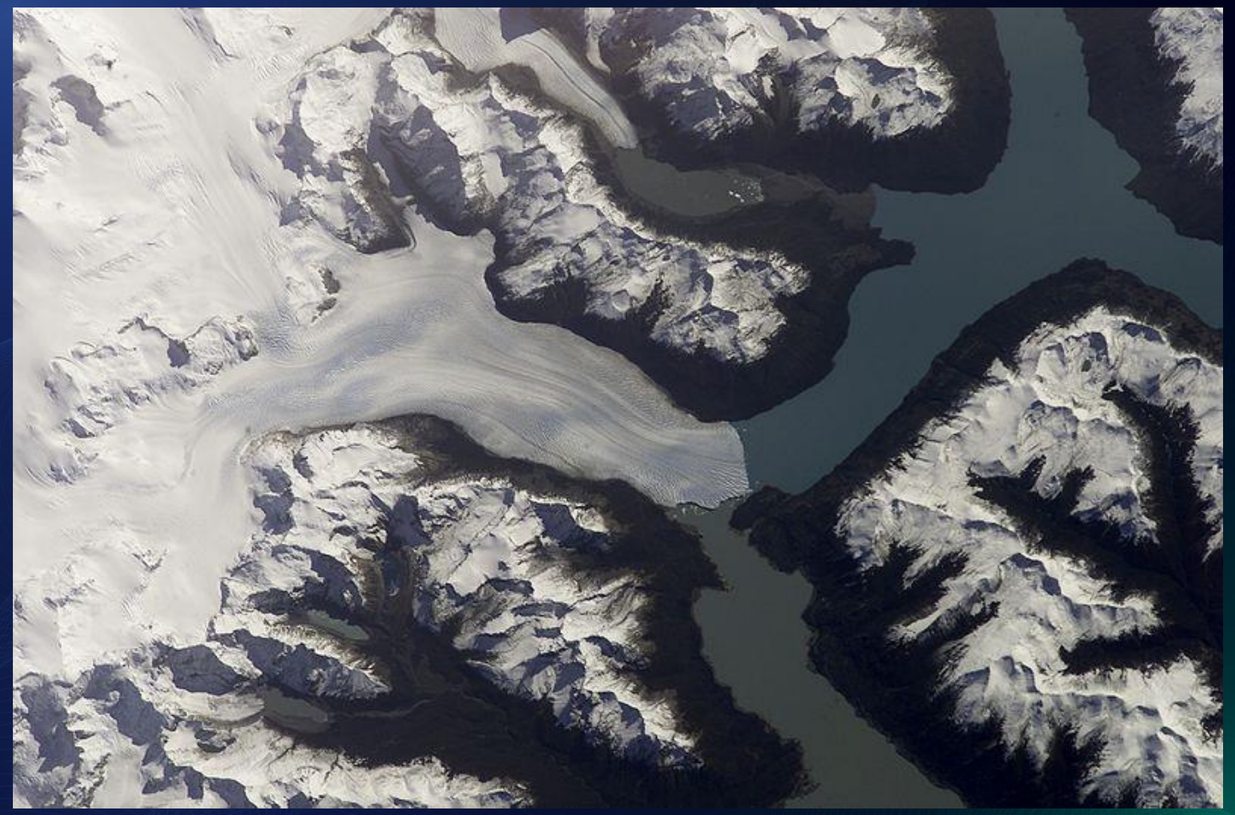


The Sputnik satellite was about the size of a basketball and weighed 183 pounds

WHY ARE SATELLITES IMPORTANT?

Additional benefits of satellites include:

- Wildlife conservation
- Sustainable agriculture
- Monitoring climate change



Perito Moreno Glacier in Los Glacieres National Park, southern Argentina

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LAUNCHING A SATELLITE INTO SPACE

Deployment of the Satcom Ku-2 satellite on STS-61-B

Most artificial satellites are launched into space on rockets. Launching a satellite into space involves a two-step process:

1. Taking the satellite to the desired altitude
2. Pushing the satellite off at the right velocity to begin and maintain its orbit

When a rocket or launch vehicle reaches the required altitude and speed, the releases the satellite into orbit.

TYPES OF SATELLITES

COMMUNICATIONS SATELLITES

Communications satellite dish at the Goonhilly Satellite Earth Station, Lizard Peninsula, Cornwall: http://photoeverywhere.co.uk

There are three types of communication services that satellites provide:

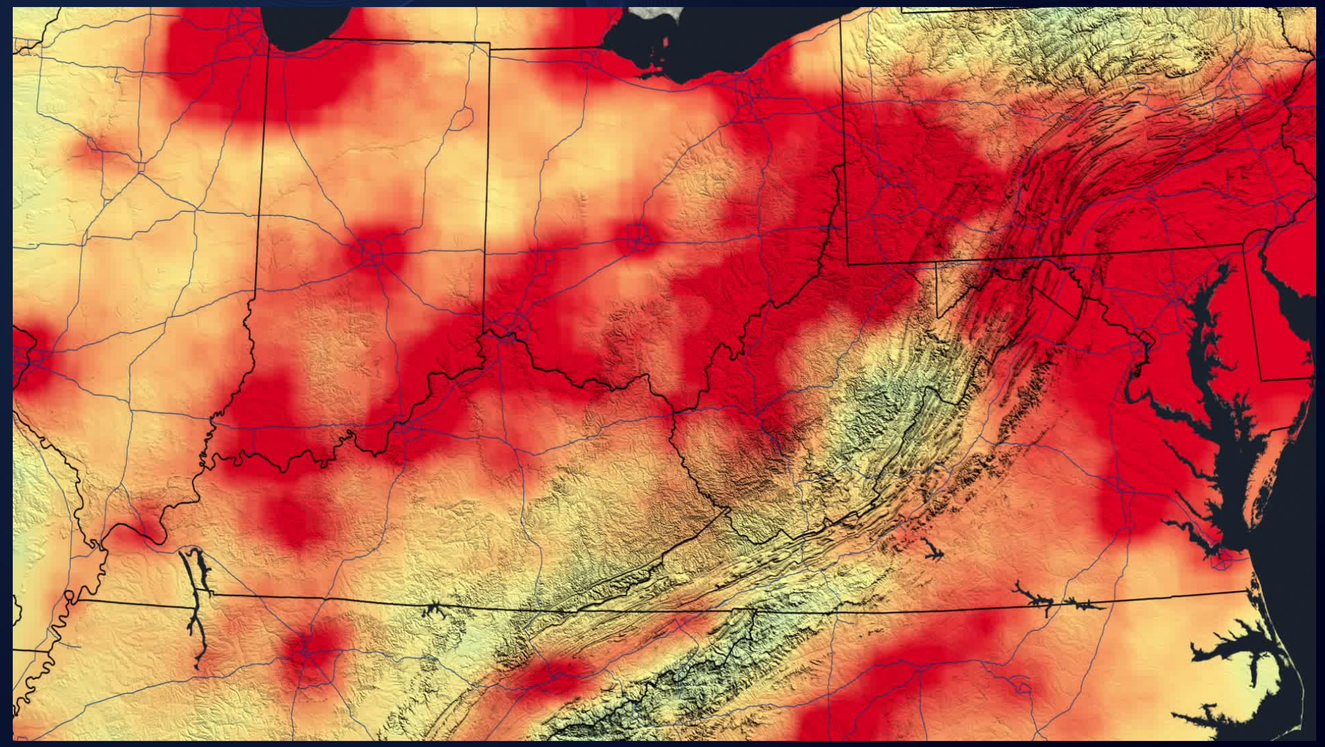
1. Telecommunications
2. Broadcasting
3. Data communications

Telecommunication services include telephone calls and services, broadcasting services involve radio and television, while data communications involves the transfer of data from one point to another.

REMOTE SENSING SATELLITES

Remote sensing is the science of obtaining information about objects or areas of from a distance, typically detecting the energy that is reflected from Earth.

A remote sensing satellite records the physical characteristics of an area by recording its reflected and emitted radiation energy without having any physical contact with the object or area under study.



This visualisation shows concentrations of nitrogen dioxide in the U.S. as detected by the Ozone Monitoring Instrument on NASA's Aura satellite: https://www.flickr.com/photos/24662369@N07/14505662584

NAVIGATION SATELLITES

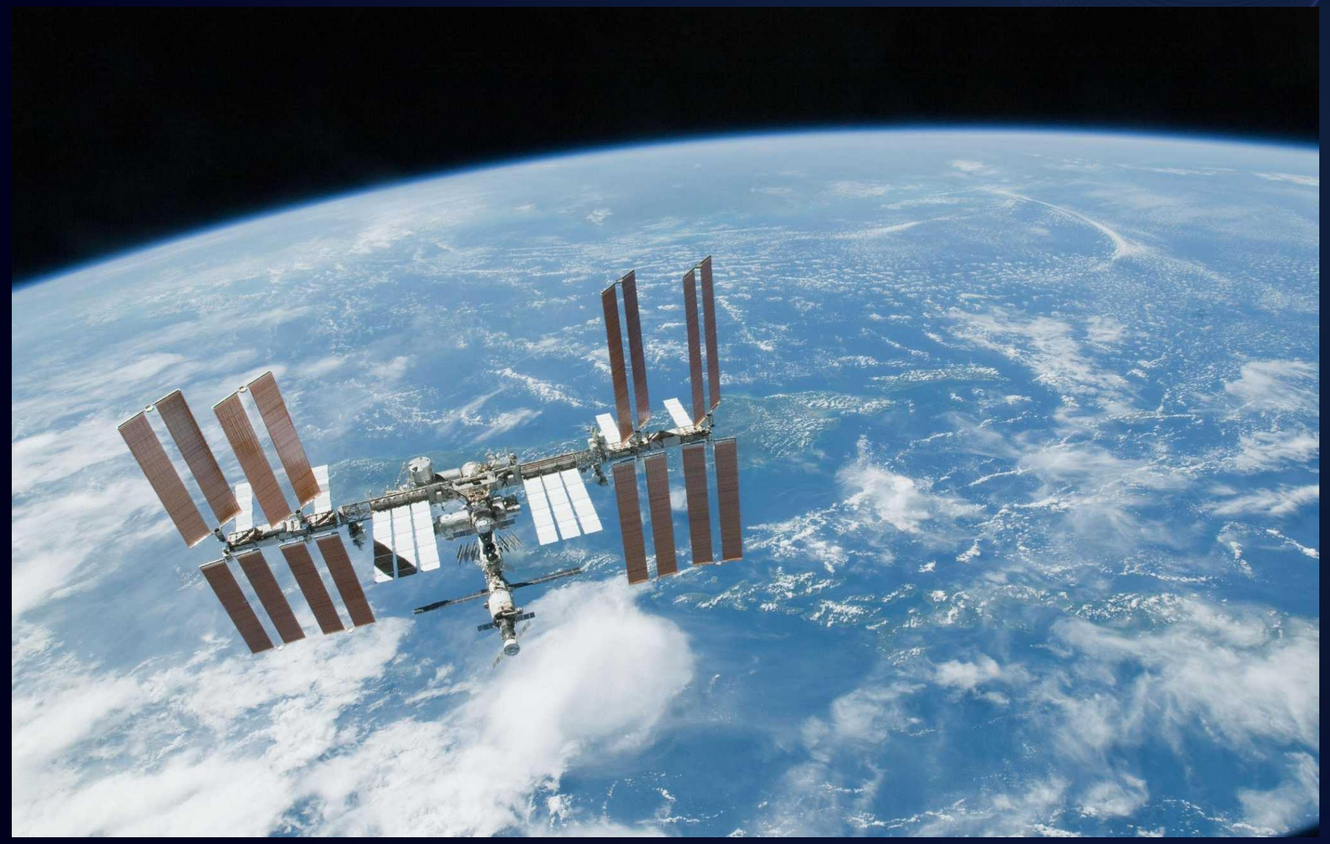
Artist's impression of a GPS-IIRM satellite in orbit

GPS is composed of three segments:

1. Control segment
2. Space segment
3. User segment

Navigation satellites emit signals to receivers that determine their location by computing the difference between the time that a signal is sent and the time it is received.

LOW EARTH ORBIT SATELLITES



The International Space Station pictured in low Earth orbit: www.nasa.gov

Low Earth orbit is an Earth-centred orbit and requires the lowest amount of energy for satellite placement.

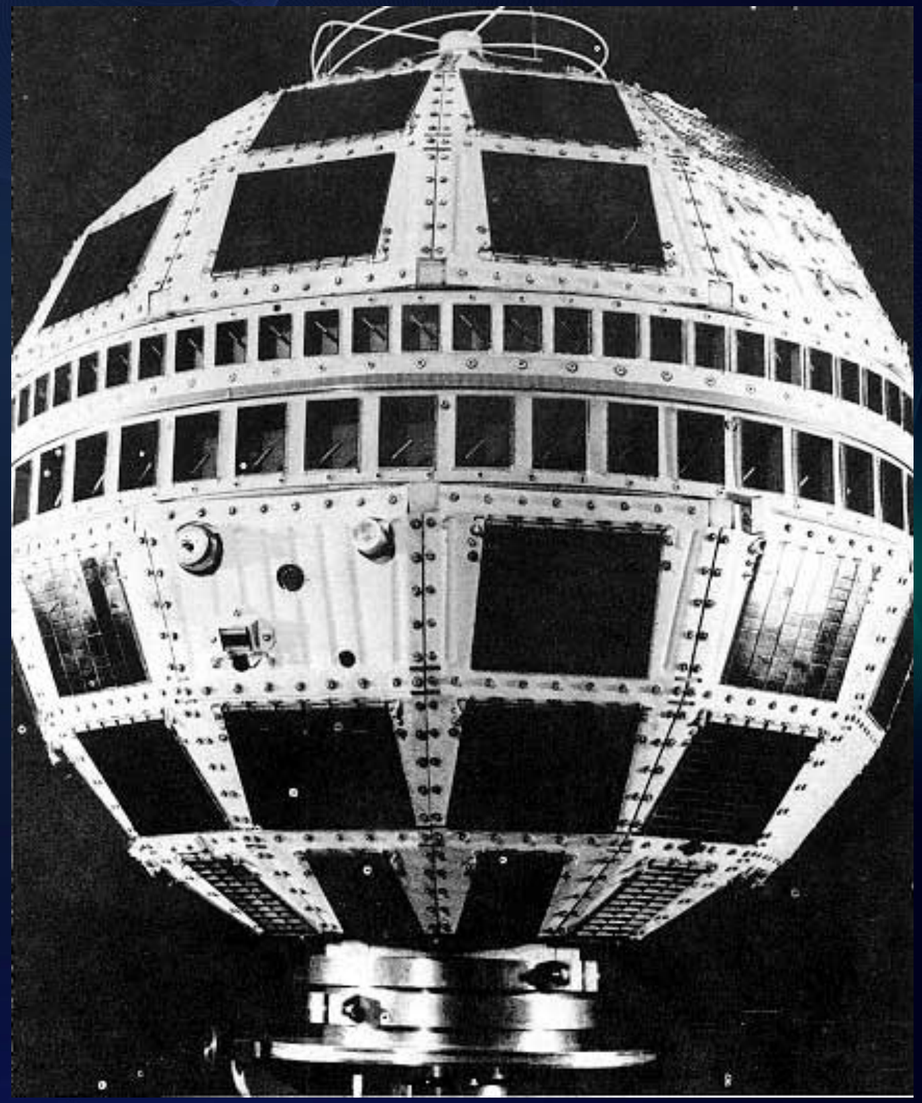
Lower orbits also aid remote sensing satellites because of the added detail that can be gained.

The LEO environment is becoming congested with space debris because of the frequency of satellite launch.

MEDIUM EARTH ORBIT SATELLITES

The most common uses of middle Earth orbit include navigation, communication and space environment science.

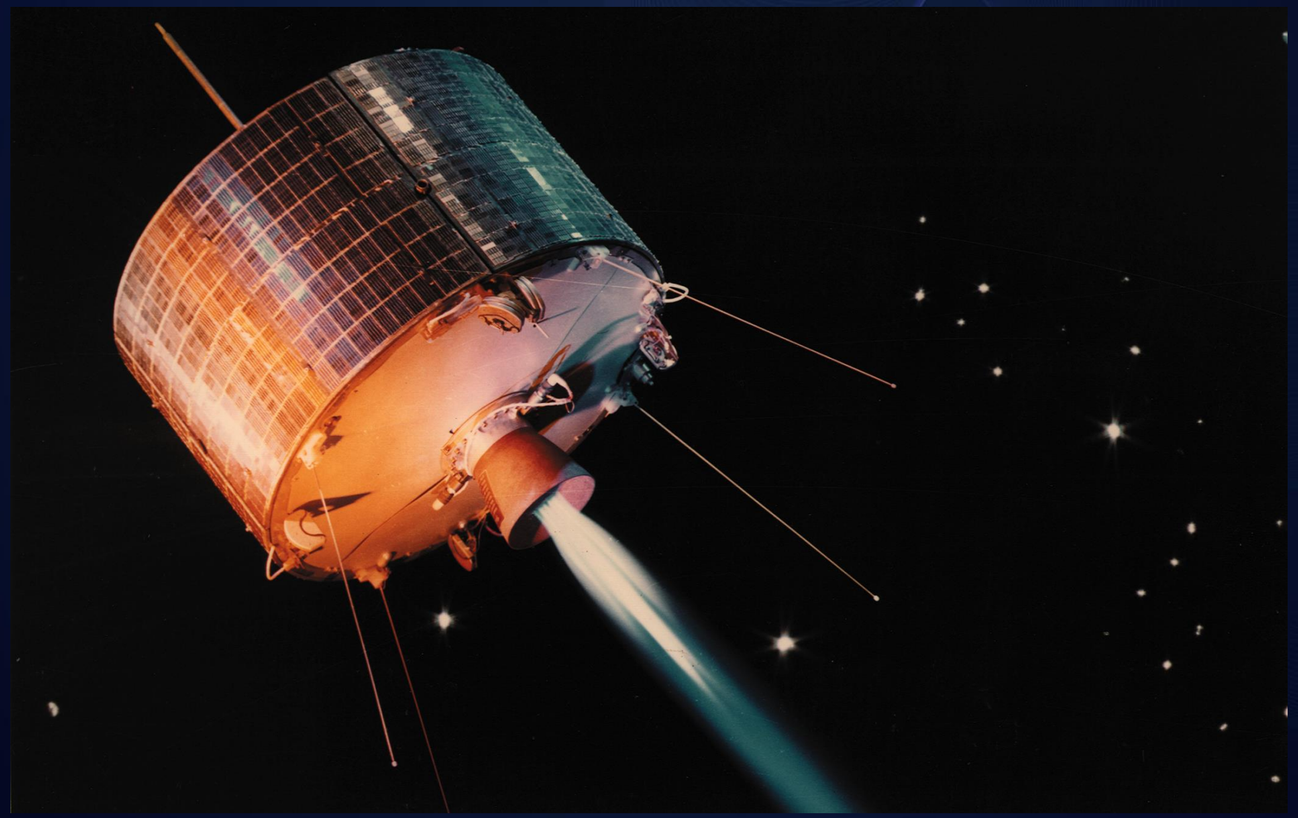
The orbital period of middle Earth orbit satellites range from about 2 hours to nearly 24 hours.



Telstar 1, an experimental communications satellite launched in 1962, orbited in middle Earth orbit

GEOSYNCHRONOUS SATELLITES

Syncom, the first geosynchronous satellite



Credit: Crown Copyright

A geosynchronous satellite is a satellite in geosynchronous orbit, with an orbital period the same as the Earth's rotation period.

A geosynchronous orbit is a high Earth orbit that allows satellites to match Earth's rotation.

PSEUDO SATELLITES

An Airbus Zephyr, a High Altitude Pseudo-Satellite (HAPS) at the Farnborough Airshow, on July 17, 2018 (BEN STANSALL/AFP via Getty Images)

Credit: Crown Copyright

https://bakermckenzie.turtl.co/story/unmanned-aircraft-systems/

Atmospheric satellites or pseudo satellites are aircrafts that operate in the atmosphere at high altitudes for extended periods of time.

A pseudo satellite provides services conventionally provided by an artificial satellite orbiting in space.

To date, all pseudo satellites have been unmanned aerial vehicles (UAVs).

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SATELLITE GROUND STATIONS

The primary benefit of a ground station network is its coverage. A station will enable operators to communicate with satellites and access space-based data far more often.

A ground station is designed for extraplanetary telecommunication with spacecrafts, or reception of radio waves from astronomical radio sources.

The Mobile User Objective System (MUOS) ground station at Naval Computer and Telecommunications Area Master Station Pacific, Hawaii

POLAR ORBIT SATELLITES

Image of southern Africa and the surrounding oceans captured by the NASA/NOAA Suomi National Polar-orbiting partnership spacecraft in April. 2015

Credit: Crown Copyright

Polar orbiting satellites observe the same area of Earth twice daily; once during the daylight and once at night.

Polar orbiting satellites provide imagery and atmospheric soundings of temperature and moisture data over the entire Earth.

THE IMPORTANCE OF SATELLITES

MONITORING AIR QUALITY

Satellite picture of Malayan Peninsular and Sumatra after intense fires

Utilising satellites to measure air quality over small areas of land enables researchers to identify hidden hotspots of dangerous pollution, improve studies of pollution on human health, and potentially tease out the effects of unpredictable events on air quality, such as the breakout of a global pandemic.

MONITORING OCEAN VARIABLES

Using satellites, researchers are able to closely study the ocean gather information concerning the following variables:

- Sea surface temperature
- Sea surface colour
- Sea level change
- Coral reefs
- Mapping
- Weather
- Tracking

Oil spill: David Rencher/Flickr

DISASTER MANAGEMENT AND RELIEF

Drone images of drastic flooding: © iStock/johny007pan

Many satellites are or may become useful tools in disaster prevention, preparedness and relief.

Satellites already provide operational capability for storm warnings and search-and-rescue efforts.

Other capabilities such as improved flood prediction and global mobile communications during relief, are close within reach.

DEFORESTATION AND FOREST CONSERVATION

Amazon fires 15th – 22nd August 2019, satellite image taken by MODIS

Landsat imagery can help locate and map out logging transportation networks, and identify burn scars where clearing has taken place.

Reasons for the importance of monitoring deforestation range from preserving the rights of indigenous peoples to preventing environmental degradation.

PUBLIC HEALTH

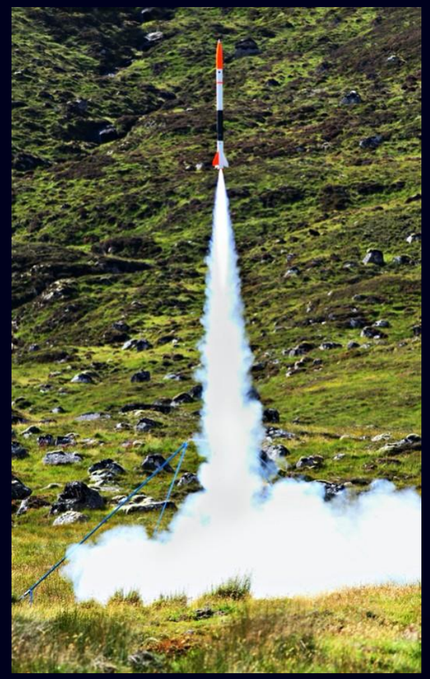
Practical applications of harnessing satellite technology for public health services include:

- Monitoring life signals remotely
- Treating emergencies remotely
- Medical tele-education
- Emergency response management

Aerial view of damage to Kirikiri, Otsuchi, one week after a 9.0 magnitude earthquake and subsequent tsunami

SUMMARY

SUMMARY



- Satellites provide an array of functions that prove immensely beneficial to mankind
- The functions mentioned in this presentation is merely a fraction of the applications provided by satellites
- Satellite technology is continuously under development for further use and action to enhance our daily lives
- Head to www.Skyrora.com for more activities concerning space and satellites

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THANK YOU!