CHAPTER 6: WAVES

Extra Info

What is a Wave?

There are many types of waves. Waves on the sea, sound waves, light waves, radio waves and waves on strings are just some of the examples. Waves can be divided into two groups, mechanical waves and electromagnetic waves. **Mechanical waves** such as sea waves, sound waves and waves on strings are waves that move through some physical medium such as **air, water, strings, earth**, etc. Sea waves move through sea water while sound waves move through air.

Light and **radio waves** are **not** mechanical waves; they are **electromagnetic waves. Electromagnetic waves** consist of vibrating electric and magnetic fields that can transfer energy through a vacuum. In communication systems using satellites, microwaves from the satellites in a space can penetrate through the atmosphere for broadcasting on the Earth. Electromagnetic waves obey many of the principles of mechanical waves but they have some important differences too.

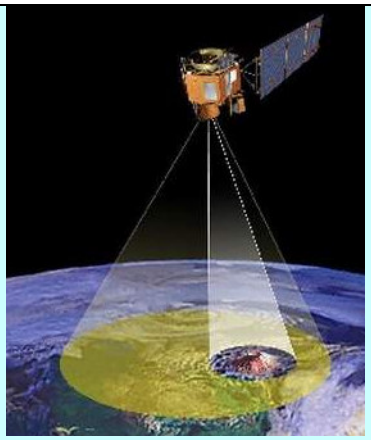
All waves behave in the same way under certain conditions. All waves experience the following.

1. Reflection – the direction of a wave changes on hitting a reflective surface.
2. Refraction –the direction of a wave changes on entering a new medium.
3. Diffraction – a wave spreads on entering an opening comparable to the size of the wavelength.
4. Interference – superposition of two waves that meet at one point.

RADAR uses **microwave radiation** of **a few cm** wavelength to detect the range and speed of a faraway object such as an aeroplane.

Wireless LAN protocols such as BLUETOOTH use **microwave radiation** in the **2.4 GHz** frequency range for wireless internet access services.

Sea waves or ocean waves



Electromagnetic waves

Types of waves