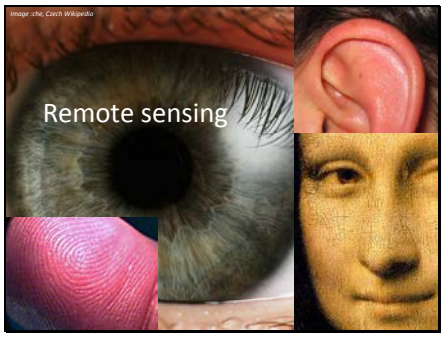
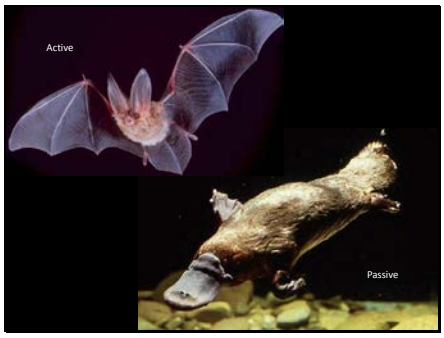
Slide 1



You have five senses.
Two of these, touch and taste, require contact with whatever you are sensing.
Smell requires a very small sample of the thing being sensed to go into your nasal passages.
But two senses, sight and hearing are remote senses. They don't require contact or sampling. Hearing works only over distances up to about a kilometre but sight works over millions of light years.

Slide 2

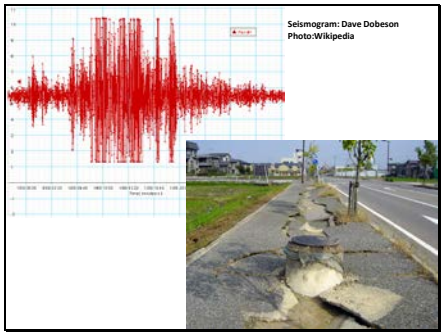


Some animals have other remote senses which we humans don't have.
Platypuses use electrical sensors in their bill to track down yabbies and other food.
Bats use echo location (sonar) to track insects.
Most of these senses are passive senses, just receiving whatever signals are emitted by the subject. But bat sonar is an active sensing system. The bat emits the sound which is reflected by the insect. This is what one bat sounds like when its call is processed to make it audible to human ears.

Slide 3

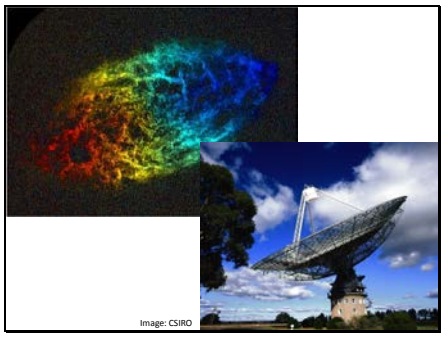
We have created other types of sensing not found in nature such as Radar.
Here we see the reflections of radio waves from rain over South Gippsland and the Mornington Peninsular.

Slide 4



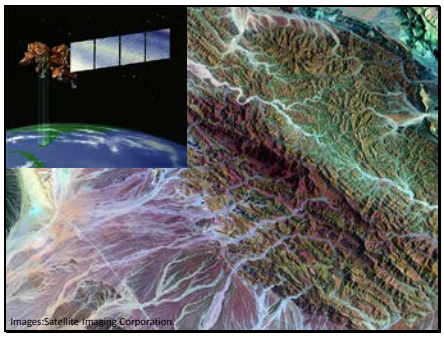
We also sense earthquakes using seismographs. Radar is active sensing, seismology is passive.

Slide 5



Radio telescopes are passive sensors detecting radio emissions from stars, nebulae and galaxies.

Slide 6

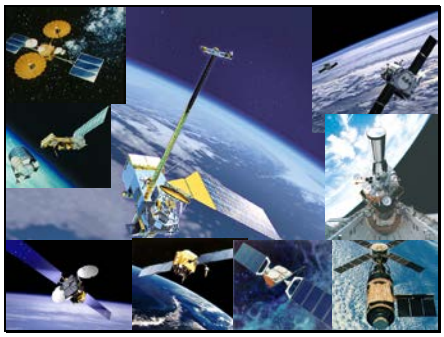


Remote sensing observatories may be satellites such as Landsat 7 which took this picture of Oman in the Middle East.

Slide 7

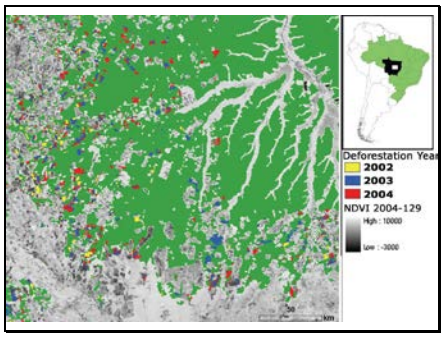
Or aeroplanes taking aerial photographs such as this one of the village of Grantchester in England.

Slide 8



There are hundreds of satellites orbiting the Earth using remote sensing for a wide range of measurements of the Earth's surface.

Slide 9

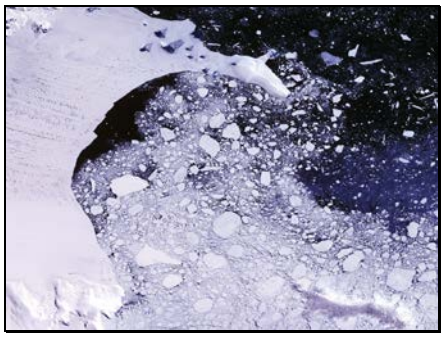


Some measure land use, such as this image showing land clearing in the Amazon.

Slide 10

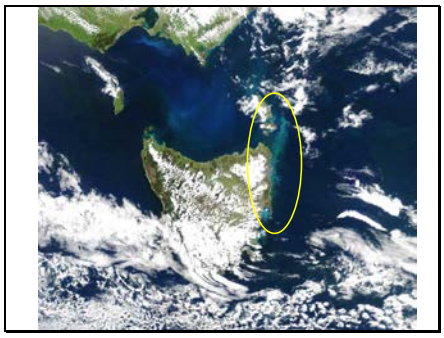
Others are used for disaster management. These two satellite photos show part of Banda Aceh before and after the Boxing Day Tsunami in 2004

Slide 11



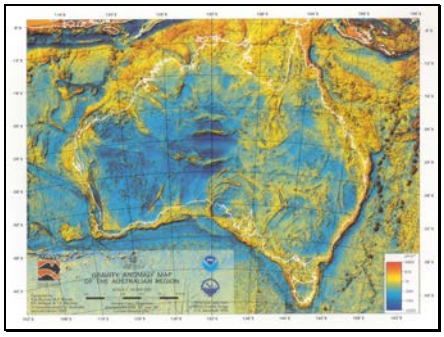
Landsat images can also show us environmental change such as the collapse of the Larsen B ice shelf in Antarctica in February 2000.

Slide 12



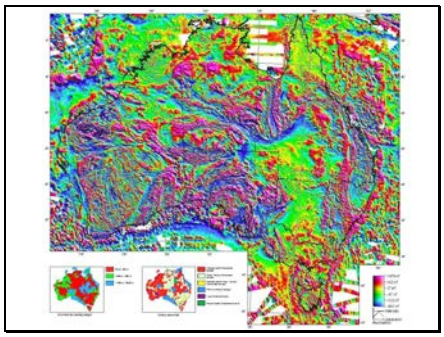
Closer to home we can see blooms of algae along the north east coast of Tasmania. (The pale wispy green stain in the sea.)

Slide 13



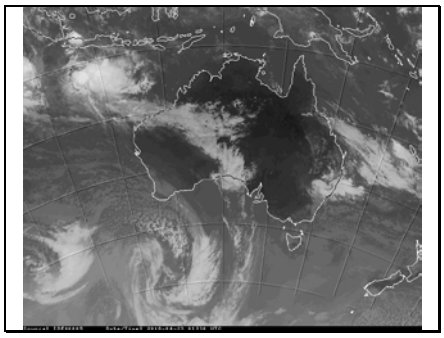
Satellites can also sense variations in the Earth's gravitational field. Maps like this can suggest places to search for minerals.

Slide 14



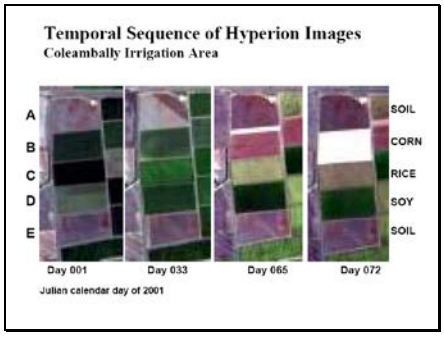
Especially when combined with a map of variations in the Earth's magnetic field such as this.

Slide 15



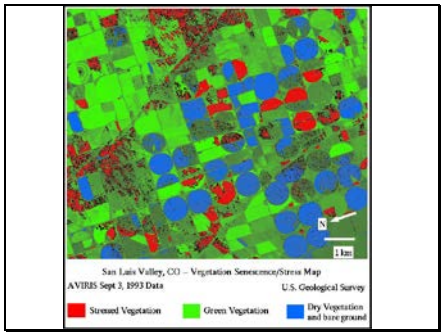
Satellites can also record infrared images such as this. Clouds and water vapour are much more visible in infrared. Australia appears dark in this image due to the dryness of the air over the land. Images like this are behind modern weather forecasting.

Slide 16



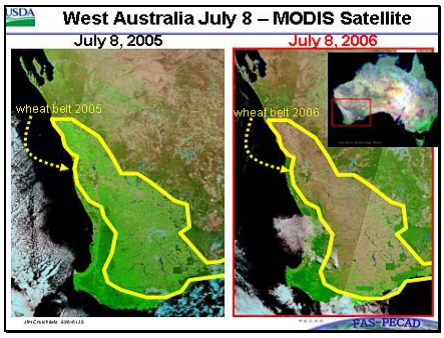
Infrared photos can also show day to day and week to week changes. Coleambally is a farming area in central NSW. These photos show changes in the water content of the vegetation and soil. The changes in Paddock B show a corn crop growing vigorously at the start of January, slow growth 33 days later, growth ceased by day 65 and the crop harvested and gone by day 72.

Slide 17



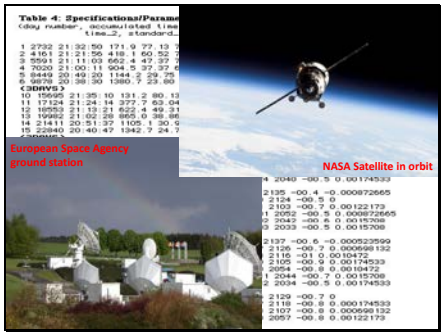
By assigning false colours to the infrared or ultraviolet parts of the spectrum satellites can show us information about crops which can help farmers make smarter decisions about water use. Those crops which show up as red in this image are the ones most in need of irrigation.

Slide 18



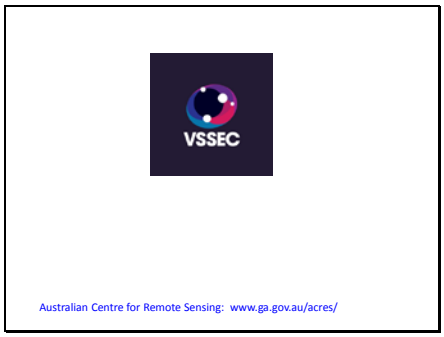
US Department of Agriculture photos such as this one allow farmers to predict crop yields months in advance and estimate future crop prices. Note the effect of the drought on the area of WA planted with wheat in 2006.

Slide 19



Data from all these satellites is transmitted to ground stations. The raw data is just numbers which must be processed to create useful images, tables or graphs.

Slide 20



For more information on remote sensing talk to your teacher, ask VSSEC staff if you visit us, or search the web. A good starting place is the Australian Centre for Remote Sensing.