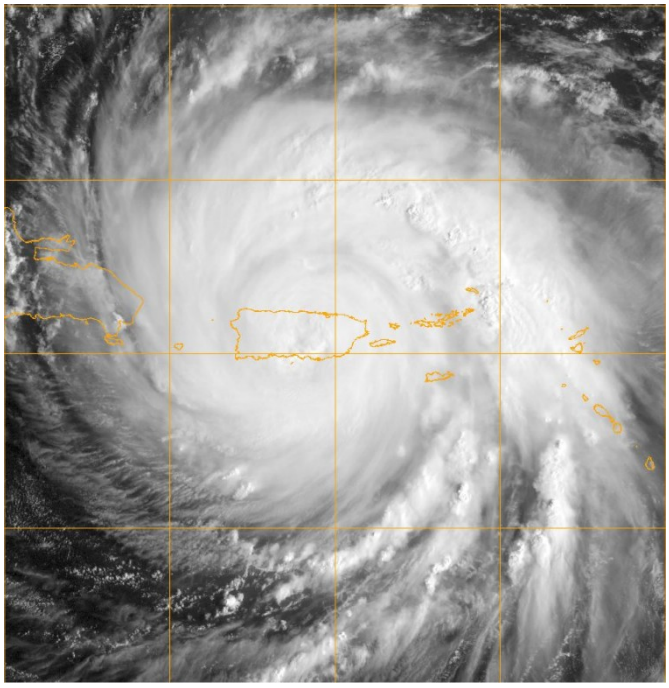
Detecting weather from space

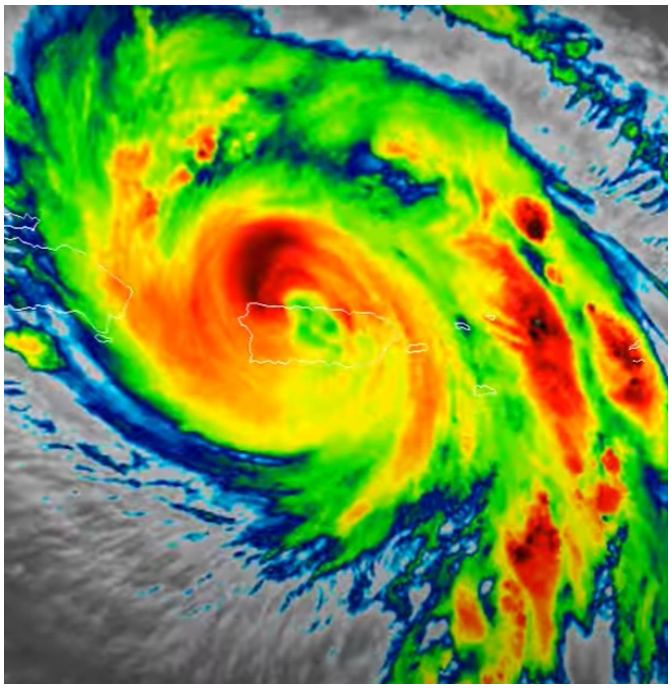
It's not always possible to detect weather from the surface. Sometimes, weather systems form over remote parts of the ocean or over nations that are not well-equipped to measure these systems. In these situations, we can sometimes see weather from space, using satellites.

There are two main types of satellites for detecting storm structure from space. These are:

visible imagery



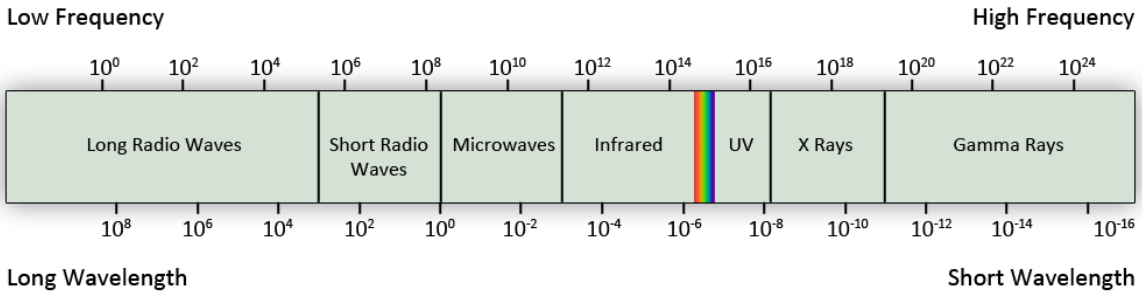
infrared imagery



The images above are from approximately the same time. They show Hurricane Maria passing over Puerto Rico in 2017. You can see the different results from the images.

Visible imagery captures everything that can be seen with the naked eye. Imagine you are on a plane looking over the clouds, this is the type of thing a visible spectrum satellite can see. This means that **you need light from the sun for these satellites to work**. On the other hand, infrared **imagery detects wavelengths that can't be seen by the naked eye**. These satellites can detect moisture, like rain, and even changes in temperature.

This image from infinity-theory.com is a good summary of the electromagnetic spectrum:



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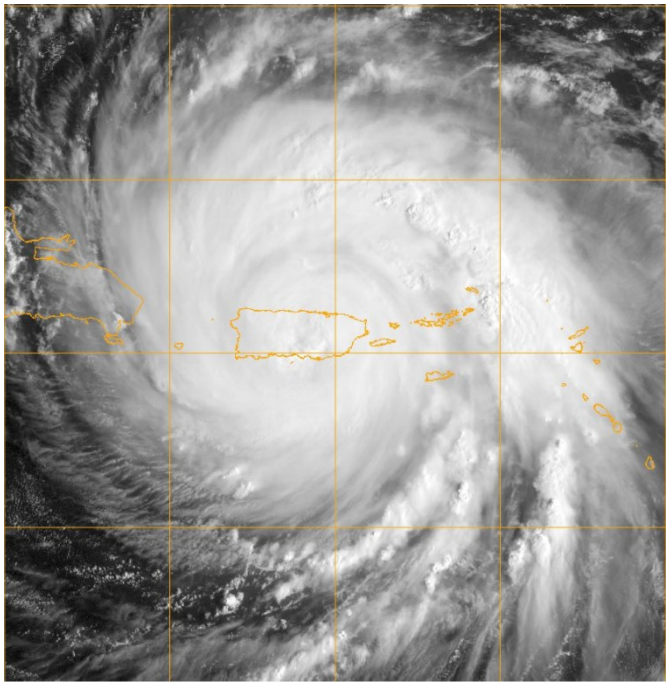
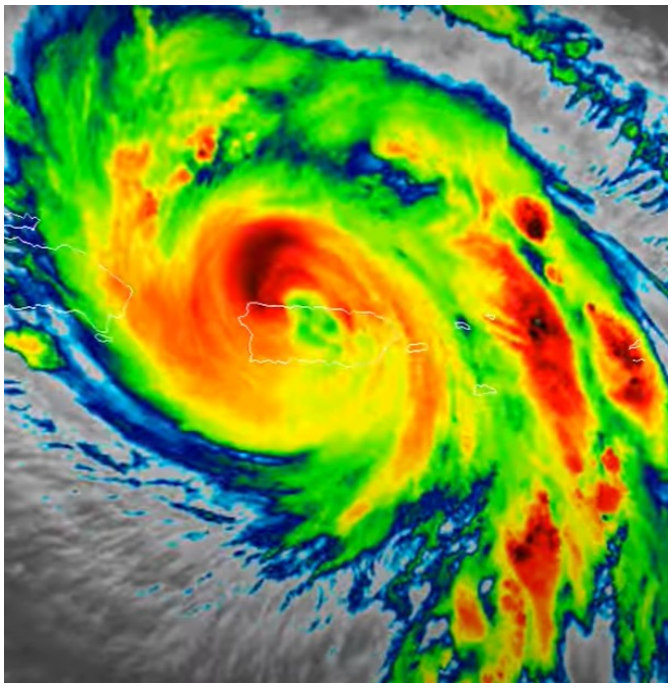


infrared imagery



1. Would you be able to see a storm using visible imagery during the night-time? Explain your reasoning.

No, because visible imagery needs a light source (the sun). During the night-time, it is complete darkness so an infrared satellite would be more useful.

2. Which type of satellite would allow you to find the temperature of the cloud-tops?

Infrared

3. Which satellite would you choose to find the bands of rain within a hurricane?

Infrared

4. If you were to design a satellite with visible imagery, would you make it stationary (so it stays over one location all the time), or "polar-orbiting" (so it keeps moving all the time)? Why?

Accept responses with logical reasoning, but the expected response from this worksheet information would be: polar-orbiting so it spends the majority of its time within the daylight hours. Otherwise, it would spend roughly 50% of its lifetime in darkness unable to make proper measurements.