

Sentinel 1, 2 & 3: summary of technical capabilities

We recently started a new era in Earth observation with the launch of the ESA Sentinels, these are a series of satellites that, for the first time in Europe, provide a long-term, consistent monitoring capability for many Earth system variables well into the future for the next 20 years or more.

There's a series of satellites that already been launched, Sentinel 1, Sentinel 2, Sentinel 3. Sentinel 1 focuses on making microwave observations, that's an imaging radar satellite. And that means, even on a cloudy day like this, we can pick out features of the Earth's surface and also image the earth's surface at night.

Sentinel 2 is a relatively high spatial resolution optical mission, something like the US Landsat satellite, but with the ability to measure in more spectral bands. It's got 13 different wave bands that it measures in. And spatial resolution is from 10 metres to 60 metres, depending on the wavelength that's being observed in. That's high enough to see individual features of these large buildings, like the Houses of Parliament we see behind me, for example.

And it also has a couple of those wave bands that are measured at a lower spatial resolution of 60 metres in order to provide an atmospheric correction to that high spatial resolution imagery, because the light from the sun that's reflected from the Earth back out into space and measured by the spacecraft that's providing this imaging capability, obviously, has to pass through the atmosphere. And we want to make corrections to those measurements to adjust for the effect of this atmosphere on the measured signals.

Then there's Sentinel 3, which is a satellite that carries a number of different instruments. In terms of optical remote sensing, the main capabilities are provided by an instrument called OLCI, the ocean colour land imager, which measures in a number of narrow spectral bands and is focused on imaging the land for studies of vegetation and land cover change and the ocean in terms of ocean colour. We're looking at phytoplankton and the distribution of sediment as well in the coastal regions and inland lakes.

And the Sentinel 3 SLSTR instrument measures in the thermal infrared to estimate sea surface temperature, but also has a capability to measure in the optical region, the visible light, and near-infrared light and shortwave infrared light, which is measuring the reflected sunlight. And those measurements are similar to those of OLCI in some ways, allowing us the capability to measure changes of the land surface and land surface state.