

## → INFRARED WEBCAM HACK

### Using infrared light to observe the world in a new way

#### → Worksheet 3

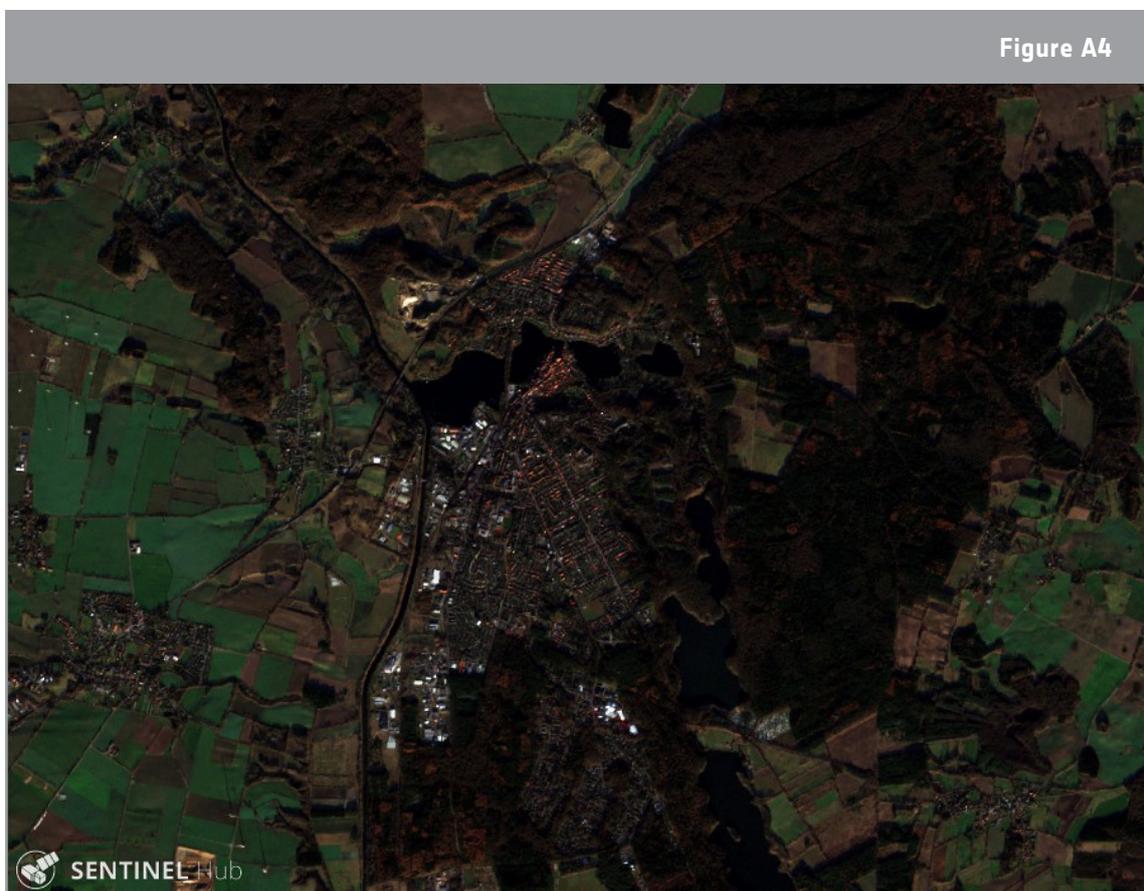
Infrared cameras are used in Earth observation satellites. With the help of computers, we can then visualise the light we cannot see with our own eyes. What comes out is a ‘false colour image’. If we display the light visible to human eyes, we call it a ‘true colour image’. A true colour image combines actual measurements of reflected red, green, and blue light, and shows the world as we see it. A false colour image uses at least one wavelength outside the visible range. As a result, the colours in the final image may not be what we expect them to be. For example, grass is not always green!

In this activity you will analyse satellite images and compare true colour images with false colour images. Will you be able to find the differences?

#### Exercise

1. Observe the true colour image below taken by the Sentinel-2 satellite (Northern Germany, 28.11.2016). Which of the following features can you identify?

- Agriculture fields
- Forest
- Lakes
- Buildings
- Snow
- Clouds
- Streets
- People
- River
- Cars



↑ True colour image taken by the Sentinel-2 satellite. Contains modified Copernicus Sentinel data [2017] processed by Sentinel Hub.

2. Observe the false colour image taken by the Sentinel-2 satellite (Northern Germany, 28.11.2016).

**Note:** The false colour image shows reflected near-infrared light as red.

a. Try to find the features you previously observed. Can you also identify new features?

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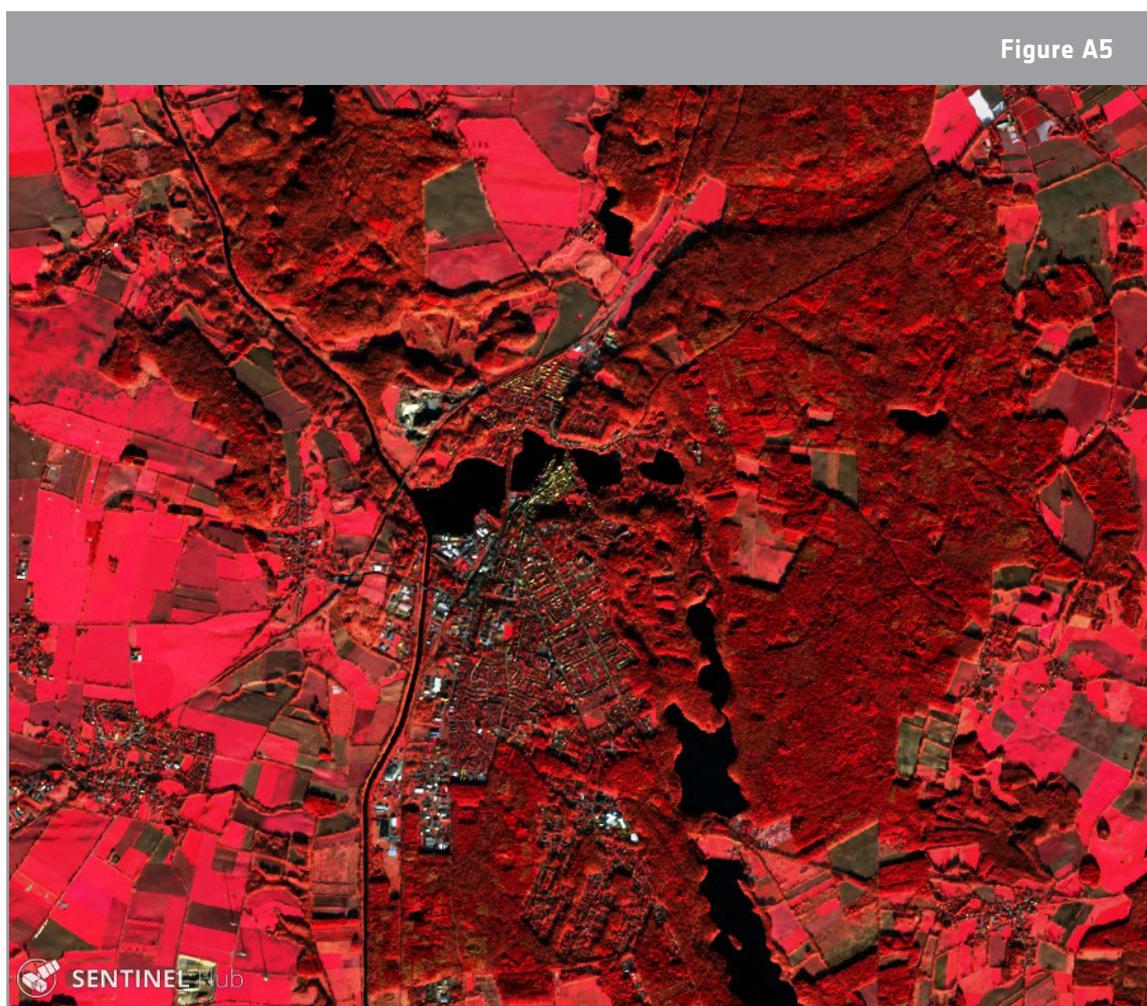
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b. What surface type/feature appears red in the false colour image? Distinguish between bright red and dark red.

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↑ False colour image taken by the Sentinel-2 satellite. Contains modified Copernicus Sentinel data [2017] processed by Sentinel Hub.

3. Describe the differences and similarities between the true colour image in Exercise 1 and the false colour image in Exercise 2.

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4. Discuss the advantages and disadvantages of the true colour images and the false colour images showing near-infrared light.

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### Did you know?

This image from the Sentinel-2A satellite shows how Saudi Arabia's desert is being used for agriculture. The circles come from an irrigation system, where the long water pipe rotates around a well at the centre. It is a false colour image and the near-infrared is displayed in red. Plants reflect most of this light. These high reflection values explain the bright red of the irrigated fields. Near-infrared light is often used to monitor vegetation from space.

