SATELLITES

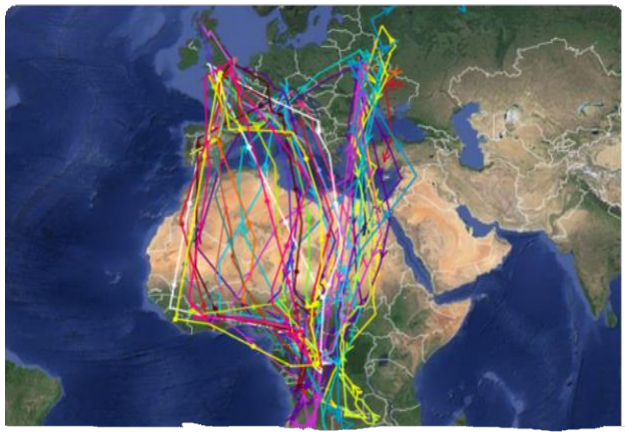
Satellite safari

Humans monitor animals for a range of different reasons, such as identifying how large or dense their populations are and ways to ensure we can protect them and their habitats. Over the years, scientists have used techniques such as identifying animal tracks, setting up cameras to record their behaviour, and simply just observing them in person.

When it comes to birds, it gets a bit trickier to follow them as soon as they take flight, so a popular method of monitoring bird species is to tag them with a tracker. This allows scientists to track their movements and gain an understanding of the distances they cover, as well as any patterns to their behaviour. The advantage of this is that once the bird has been tagged, data can be recorded for a long time without humans monitoring them in-situ.

The first birds remotely tracked using satellites were albatrosses, back in 1989. Since then, scientific understanding of the lives of bird species has improved dramatically. We know much more about where they travel, whether for migration or hunting for food for their chicks, and ways they could be impacted by human activity; such as persecution or expanding human infrastructure.

There are different tagging systems which use slightly different methods of tracking a bird's location. For example, Argos – a network of satellites dedicated to environmental studies – use Platform Transmitter Terminals tags (known also as Doppler PTTs), on the birds that emit signals that the satellites will pick up. This signal's pitch will vary depending on the distance between the tag and the satellite, meaning the bird's location can be pinpointed with a good degree of accuracy. PTTs are small enough that they can be used on birds as light as 100g, such as cuckoos.



The best-known tagging system however is GPS, which utilises signals from multiple satellites all around the world. This activity will use GPS signals. Cuddly toy birds are fitted with a GPS tracker – an Apple AirTag – and participants work out where they are hiding by tracking locations using the 'Find My' app on an iPad. This works ideally as an outdoor activity where the birds are 'nesting' in their habitats and participants explore in small teams to identify where they may be.

Kit list:

- iPad with 'Find My' app enabled and account set up. This requires an Apple ID necessary to connect with AirTag
- GPS settings can be configured under Settings > Privacy & Security > Location Services.
- We recommend choosing location access "While Using the App" for this activity.
- Apple AirTags
- AirTag keyrings
- Cable ties
- Cuddly toy animals
- Other examples of birds that are fitted with satellite tags are stone curlews, gannets, albatrosses, swifts, cuckoos and manx shearwaters – though these may be hard to find!

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Method

1) Set up your AirTag:

- Follow the instructions to set up your AirTag with your iPad. You may need to configure your Location Services settings to do this.
- You can name your AirTag and choose an emoji for it. There are a select range of birds, but you may also want to choose, for example, a satellite!
- If you want to change this chosen name or emoji at a later time, you can do so under the 'Rename Item' option.

2) Attach AirTag to cuddly toy:

- Secure your AirTag to your bird – we recommend using a keyring and cable tie, as detailed in the kit list above.

- Satellite tags are usually worn on a bird's back, often at the base of the wings.

- Your bird is now 'tagged', meaning satellites can work out where in the world it is.

3) Secure your bird in your chosen location:

You can now hide your bird in your area of choice. Some things to consider:

- Height will not be considered when you are shown the bird's location. For example, you could hide three birds on the ground, first, and second floors of your centre. If they are all located directly above each other, all three will show as being in the same location on the app.
- You may need to secure your bird to prevent it from being moved after you have positioned it. This may just mean cable tying it down. The benefit of using an AirTag is that you will be able to see where it's been taken if it does go anywhere!

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4) Wrap up the activity:

- Ask your students where they found the bird.

- How accurate was the satellite location?
- Why might it nest there?
- Do you think it will live there all year?
- What do you think it eats?
- How often do you think it hunts?

- The satellite location of an AirTag can range to about 30 metres, so isn't always perfect. However, when you consider that satellites are in outer space and they can pinpoint location to such a small area, it's impressive!
- These are the kinds of questions that scientists, like conservationists, may try and answer when learning more about bird species.

How can this be adapted for different audiences and ages?

General:

- You can run it with different soft toy animals that may use GPS trackers, such as whales, crocodiles or tigers.

- If your centre has multiple iPads and AirTags, you can run it as a challenge whereby different teams are searching for different birds to see who can find them the fastest.

- This is, at its core, a hide-and-seek activity, so variations could be run without the GPS tag. A fully analogue version could run as a call-and-response style activity, whereby the hider is the tagged animal and the seeker is the satellite tracking them. The calls and responses are the signals transmitted between the tag and the satellite.

Outdoors:

- We recommend running this activity outdoors, if that is possible in your space.
- The birds don't necessarily need to be physically accessible by the participants, but they must at least be visible. For example, you may want to place a bird in a tall tree, so children can't reach it but they can still see where it's nesting.