Dataset description for: Wood ants learn the magnetic direction of a route but express uncertainty because of competing directional cues

The data for each Ant in the experiments described in all but Figure 7 is held in matlab files with the name as follows:

AntU_LN22WESTtest_1522_31072019_Published.mat

The identity of the ant is encoded by the letter after Ant ie U

The time and date of the experiment are the last 2 numbers respectively ie here 15.22 and 31st July 2019

The trial number is indicated by the number after the LN ie here, 22. This shows the direction that the coil was set to relative to local west as per table 1 in the paper (and copied below for clarity):

Table 1: Left column: trial number of each test. Right column: direction of coil West relative to local West for each test. The coil was inactive for trial 26.

Trial no.	**Local West**
14	60°
22	315°
26-early	0° local West
30	310°
33-early	60°
38	0°
39-early	270°
43-early	45°
47	45°

In each file there are the following variables which hold data for the ant's position and orientation for each frame of the video for which the ant was detectable:

- t is the time point from the start of video recording in seconds. As we analysed data for 2 second intervals from the start of recording we took the first time point ie time = 0 to be t(1) (but here we upload the raw data).
- Cents is a 2D column vector giving the [x,y] position of the ant, relative to the nest, in cm.
- However, because the data are taken from a camera where y=0 is at the top of the screen the way we have shown the trajectories in the experiments is with this convention. This does not affect the data but affects how one interprets the angles in Table 1 (see plot below for detail)
- sOr is the body angle of the ant, ie it's facing direction, in radians. This angle is given relative to the direction from nest to the coil-indicated food position (although there was no food in this test data).
- Where the food would be (as indicated by the coil) is in the variable LM as an x-y coordinate (in the same coordinate frame as Cents)
- This has been set in the coil relative to local West (see table 1). The direction of local West relative to the release point is given as an x-y coordinate in the variable westPos (see figure 1)

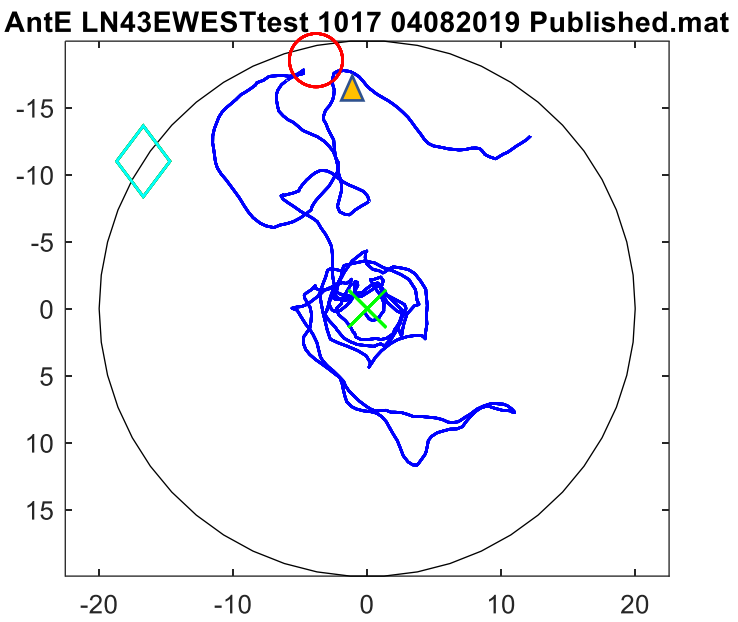
- The centre of the release point is the centre of the arena. It is in the variable nest which is [0,0] by default as all as the positions are given relative to the centre of the release point.

Plotting the data: Regarding the way we display the data and the fact that y increases from top to bottom, this can be easily done by the command (in Matlab): set(gca,'YDir','reverse')

So, to plot the trajectory for Ant E on trial 43 you do the following:

```
load AntE_LN43EWESTtest_1017_04082019_Published.mat
plot(Cents(:,1),Cents(:,2),'b',nest(1),nest(2),'gx',LM(1),LM(2),'ro',westPos(1),westPos(2),'cd','Marker
Size',20,'LineWidth',1)
hold on;
MyCircle(0,0,20,'k');  % NB this is a function I have- it just draws a circle at 0,0 of width 20
title(s(i).name)
hold off;
axis equal
set(gca,'YDir','reverse')
```

Figure 1: trajectory of ant E on test 43 (blue line). Centre of release point is the green x and the coil indicated direction to the food is shown as the red o which is where the food would be (there is no food in tests). The direction of local west is given by the cyan diamond on the edge of the arena (black circle). The yellow triangle shows the start of the time course given in Figure 2



NOTICE THAT NOW Y INCREASES DOWN THE PAGE. This does not affect the positions or orientations but only how one interprets the angles in Table 1. Local west is shown by the cyan diamond. As this is test 43, the coil is directed to a point that is 45 degrees Clockwise from this position, *when viewed with y increasing down the page*

Figure 2: sOr, the body angle of the ant, in degrees, from the point indicated by the yellow triangle in Figure 1 to the end. sOr is given relative to the coil direction (ie from release to red circle in Fig 1). This is 0° with angles increasing clockwise. Here the ant initially moves down and right away from the release-food direction but ends at ~90° to it.