Supplementary material SM2: Use of the DJI-Flight Planner software to create flight plans

Sixty-four identical flight plans (i.e. the number of cells within our survey area) were created in DJI-Flight Planner (https://www.djiflightplanner.com/) using the following steps:

* + Step 1: import the KML file of the survey cell.
	+ Step 2: select the desired UAV and image aspect ratio (here P4Pro 3:2). The software then automatically fills the sensor characteristics such as focal length, side pixels, forward pixels, side and forward field of view and pixel size (Figure S1A).
	+ Step 3: enter information about desired flight altitude (here 90 m), and front and side image overlap (here 70 and 20 % respectively).

The number of and spacing between transects and the total transect length (and hence the total transect fly-over time excluding transit to the first transect waypoint and return from the last transect waypoint), the required UAV ground speed, and the image capture rate are then automatically calculated.

* + Step 4: enter a transect angle value (here 100 °).
	+ Step 5: review the flight plan and export it as a *csv* file.
	+ Step 6: select between start/stop or continuous flying (here we chose continuous flying).
	+ Step 7: select whether the flight plan needs to be split into smaller sized plans (i.e. if plan is too large for a single UAV battery; splitting the flight plan wasn’t required in our case as our flight plan was way below the maximum flight time for the P4Pro).

Upon saving the flight plan file DJI-Flight Planner warns the user that the start of the camera triggering has to be manually started when the UAV pauses at the start of the first transect (i.e. at the first waypoint). The software also provides essential information on cruising speed and frame-rate which need to be entered manually in Litchi before the flight.

## Additional notes

The approach of undertaking a full coverage of a cell using forward and lateral image overlap settings is a good way to address the issue found with most flight planning software being designed for users using UAVs to create an entire image of a cell (more commonly called ‘orthomosaic’) and so where it may not be possible to set flight plans based on individual transects and even less likely transects that are distant to the point of creating a negative side-overlap between images.



**Supplementary Figure 1 |** Example of a flight plan created in DJI Flight Planner (© AeroScientific, available at https://www.djiflightplanner.com) for the survey of a 0.49 km2 grid cell. Panel (A) shows the pop-up window to complete steps 2 and 3 and a spatial representation of the survey cell represented in green. Panel (B) shows the resulting flight plan with key flight characteristics (left of panel), estimated image surface cover (purple polygon), transect line (bright green lines) and position of image capture (white circles).