**SUPPLEMENTARY MATERIAL: Analysis of effect on speed estimate by sampling rate**

### 1. OBJECTIVE
Speed estimates are likely to be affected by the sampling rate used during tracking. In the present study positions were recorded every 2nd second. We performed an analysis of the effect of sampling rate on speed estimate. Furthermore, we have treated a subset of roosting trackings according to Bruderer & Weitnauer (1972) to explicitly investigate the effect of the differences in method on speed estimates between that study and the present one.

### 2. ANALYSIS
To investigate the effect of sampling rate on the speed estimate we reduced the effective sampling rate of a subset of roosting trackings (n=17) stepwise to contain positions every 4th, 6th, 8th, 10th, 16th and 30th second. Each of these sets of files was then processed as the original full resolution files and the ground speeds of these were compared with the original result. To study the effect of difference in method between the present study and that by Bruderer & Weitnauer (1972) we used the files reduced to a sampling rate of every 30th second (the sampling rate used by Bruderer & Weitnauer (1972)) and calculated mean flight speed by averaging over the speeds between each of the points without any intermediate steps.

### 3. RESULT
The analysis shows that increasing the time between recorded positions (lowering the sampling rate) gives a speed underestimate. Figure 2 shows the mean difference in calculated ground speed for each sampling rate compared with the original full resolution files (containing positions every 2nd second). The replicated Bruderer & Weitnauer method showed that the difference in speed estimate against the full resolution files was on average -0.15 m/s.
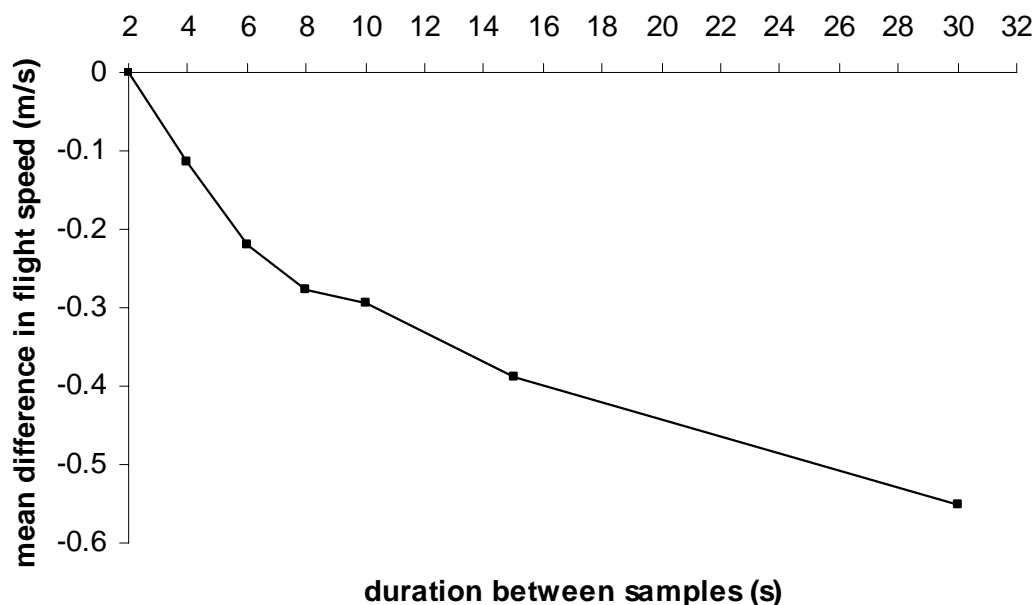


Figure 2. Mean difference in calculated speed for different sampling rate compared with the original full resolution file containing positions every 2nd second.