Estimating Seabird Flight Heights from Digital Aerial Surveys for Offshore Wind Assessment

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Offshore wind development is expanding globally, with potential seabird collisions representing a key environmental risk requiring robust assessment. Uncertainty in seabird flight height data remains a major challenge for collision risk modelling, particularly where baseline data are limited, increasing uncertainty in impact assessment and consenting. Improved, scalable methods for estimating flight heights are therefore needed to support proportionate, evidence-based decision-making.

We will present a novel method for estimating seabird flight heights from Digital Aerial Surveys (DAS). Ultra-high-definition video collected from altitudes >500 m minimise disturbance while capturing seabird abundance, distribution and behaviour over large areas. Flight heights are estimated using HiDef's Advanced Photogrammetry method; comparing body lengths of flying birds with a reference dataset of individuals flying at the sea surface, identified by their reflections, and applying simple geometric principles.

To address natural variation in individual body size and sampling uncertainty, a bootstrap process generates sample-level flight height distributions suitable for collision risk modelling. To validate the method, we undertook flights to compare flight height data estimated using the HiDef Advanced Photogrammetry method and, separately, for LIDAR. The results showed that the proportion of kittiwake at collision risk height calculated using Advanced Photogrammetry are within 2% of the LiDAR-confirmed estimates, even at small sample sizes.

This method provides a cost-effective way to generate key flight height data required for Collision Risk Modelling at scale, without the need for additional costly sensors. It offers a practical tool to contribute to filling critical knowledge gaps and support timely, evidence-based environmental approvals for offshore wind development.