

Trial of UAV/Drone at Langstone Harbour RSPB reserve, 2019

During 2019, a Mavic 2 *Unmanned Aerial Vehicle*, commonly known as a *drone*, was made available from the LIFE Roseate Tern project for exploring seabird colony monitoring options within the Solent. Along with trials at the Lymington saltmarsh colonies, the Langstone Harbour RSPB reserve was one of the trial areas. Permission was sought and gained from Natural England and the Langstone Harbour Board pre season with the Site Manager receiving current training from the LIFE Project lead.

Four flights were undertaken on the reserve, two of these were over Long Island with the other two over South Binness.

The first flight took place over Long Island on June 24th as a basic trial of handling, filming and disturbance potential away from the main harbour colony site on South Binness. The drone was launched from the public landing area on long island at Broad Point (no public were present at the time) and flown along the length of the island and back. Once in the air and moving northwest, the drone drew almost immediate attention from Oystercatchers and up to 10 at a time flew large circles around it during most of the flight. Gulls and other birds did not react with the exception of those within the immediate launch and landing area. The footage gained was of a superb quality and the whole process proceeded very smoothly with the whole flight lasting approximately 10 minutes.



Above) The view from the drone looking North West along the old ridge of Long Island. Three Oystercatcher can be seen on the left of the image on a close swing past.

With the staff, equipment and necessary calm weather in place, the second trial flight followed on the same high tide over South Binness. The launching site was on the far west of the island, approx. 50m to the north west of the shingle ridge's western extreme. The initial approach towards the breeding colony was at a height of circa 50m and this resulted in a large part of the

nearby colony taking flight in a 'dread' pattern. As a result of this, forward motion was stopped, and the drone was raised to height of circa 80m.



Above) Black-headed gulls take flight in response to the drone during the initial approach on South Binness.



Above: Dead Mans Head from circa 40m. Gulls are clearly visible but with limited detail on high zoom.

After a pause whilst gulls resettled, forward flight was resumed at 80m and no further disturbance was recorded. The length of the shingle ridge on the southern and eastern side was flown with footage and photo's being taken. Once Dead Man's Head on the island's north east tip was reached, the drone was slowly brought down to circa 40m for a closer look (no disturbance was recorded) and then flown back to the launch site for landing without further incident. The photo's were subsequently analysed and although a full count of sitting birds would be possible, the relatively high position of the drone during most of the flight meant that differentiation of species and nesting/roosting birds was difficult.

On the following day, June 25th, whilst a ringing team worked on the western tip of the South Binness colony, the opportunity was taken to repeat a flight over the eastern ridge and Dead Mans Head at a lower level for higher resolution photographs. The launch site was again the western edge of South Binness. On this occasion, the drone was launched and brought up to an altitude of 80m. After a quick scan around the vicinity, it was flown over to the southern point and then slowly brought down towards the colony, watching carefully for signs of disturbance. Over the course of 90 seconds the drone was lowered to 15m without incident. After footage was taken at this height, the altitude was raised to 30m and then the drone was slowly flown north along the main eastern ridge in small movements with pauses. On reaching dead mans head, the drone was brought back down to 15m and further low level photos were taken covering the whole section of the colony before returning back to the launch site.



Above) A closeup of part of the Sandwich tern colony near Dead Mans Head on South Binness island. This photo was taken from circa 15m and the species of birds present can clearly be determined with Sandwich terns, Black-headed Gulls and their young present.

The photo's were analysed by zooming in on standard pre-supplied software (Microsoft Paint 3D) and the young of each species were counted. These results were then compared to the most recent standard boat based productivity survey which had taken place just two day's earlier on June 23rd. The drone survey revealed a surprising 64% increase in the number of Black-headed Gull young recorded.



Above) Black-headed Gull young (circled in light green) and sandwich tern young (with parent, both circled in light blue) as recorded on June 25th. Note the surrounding vegetation which prevented normal counting methods from accurately recording numbers.

Boat based surveys, from a horizontal viewpoint, are obstructed by vegetation within the colony site and wave motion during observations can add to their difficulty. Although some birds are also likely hidden in vegetation from the drones visual angle, the number is clearly much smaller.

Figure 1) The results of the nest count and young survey monitoring from Dead Mans Head.

Black-headed Gull clutches being incubated on May 10 th :	Number of Black-headed gull young recorded via boat based count on June 23 rd :	Number of Black-headed Gull young recorded during drone survey on June 25 th :	Percentage increase in Black-headed Gull young recorded by drone compared to boat based count:
362	185	304	64.32%

The ability of a drone survey to provide detailed, checkable data for ground nesting seabird monitoring in a colony setting was quite clearly demonstrated during this survey of Dead mans head. The analysis of the images via the method above took considerable time however and as

a result (and due to the many other pressures on time during the breeding seabird season) further flights for the purpose of monitoring the rest of the colony did not take place during 2019. A small review of others working on methodology for ground nesting bird surveying via drone suggests there are faster ways of performing this analysis but that they require some specialist software. This will hopefully be a possibility in the future. Either way, further exploration of UAV use for monitoring shows real promise.

On July 1st, one further flight was made over Long Island following a similar flight profile as the first flight. Once again, the only attention paid to the drone was from the Oystercatchers in the vicinity who circled around the drone at height. Footage from this flight has already proved very useful in planning future habitat restoration work and revealed useful insights in the layout of the older shingle ridges on site.



Above: Long Island (foreground), South Binness (back right), the Round Nap (centre) and Hayling Island (background) from circa 100m above long island on July 1st, 2019.