

## GSM IS HERE – Update

Since obtaining PTCRB and worldwide certifications for our GSM20-70 product line, we have been busy with further field testing in North America, South America, Europe, Africa and the Middle East.

Results of field testing have been spectacular thus far – the high number of GPS positions per day will be extremely valuable for habitat-use studies. The GPS/GSM transmitters are able to transmit a considerably greater quantity of data than Argos/GPS PTTs, which have a more limited throughput ability. In addition, their enormous storage capacity allows the GPS/GSM transmitters to archive data for a more advantageous transmission time. Should a bird move to an area outside GSM range, where data cannot be uploaded, the device will transmit all unsent data in reverse chronological order to backfill the track once reconnected to the GSM system.

Similar to our Solar Argos/GPS PTTs that have been available since 2001, the GPS/GSM product line employs a microprocessor to control solar charging, enabling nighttime GPS fixes to be obtained and transmitted through the GSM system. The GPS/GSM transmitter has the added capability of varying its recording rate; when the conditions are sunnier and the unit has better battery charge, it will take more frequent GPS fixes.

Figure 1 shows the track of a lesser spotted eagle, tagged with a prototype 25g GPS/GSM transmitter in Germany, on its southerly migration through Africa. With GPS fixes often occurring only minutes apart (each with

altitude, VDOP, and HDOP; averaging 70 fixes per day, up to 187 per day in this case), the level of resolution is a substantial increase compared to what can be obtained using a solar GPS PTT. The inset in Figure 1 shows how the bird hugged the shoreline of Lake Tanganyika as it traveled from Tanzania into Zambia. Although the route taken by this bird through Africa occurred mostly over land, the transmitter was out of range from GSM towers much of the time. However, the archived GPS fixes were uploaded once the transmitter reconnected with the GSM system. The uploading of GPS data from areas with sparse or zero coverage is significant for the track



Figure 2. Osprey migration through Caribbean.



Figure 3. Black vulture movements in Spain.



Figure 1. Lesser spotted eagle migrating from Germany through Africa with inset showing the track along the Lake Tanganyika shoreline.

of an osprey that traveled south from Hispaniola over the Caribbean Sea on its migration to South America (Figure 2). Obviously, there is no GSM coverage in the middle of the ocean (yet). Thus, the GPS fixes that occurred during that time period were uploaded from the bird's 30g GPS/GSM transmitter a few days after this crossing. In southern Europe, where radio interference reduces the amount of data received through Argos, a 70g GPS/GSM transmitter deployed on a black vulture in Spain provides voluminous amounts of GPS data (Figure 3). We can't wait to see what amazing scientific progress will be made using this technology! This is merely the beginning. Please visit our website for more information about our GSM transmitters.

## Bits & Pieces

Our office will be closed December 24 through January 1.

Dust off your cameras for our 2013 Photo Contest!

Don't forget to send us your recently published 2012 and 2013 papers for our website.

A reminder: We do not accept bird PTTs for refurbishment from March 1 through August 31!