TRACKING GOLDEN EAGLES: Part two

The ability to use GPS location technology and improved batteries transformed our ability to track golden eagles.

Spatial accuracy was much improved once GPS tags were developed. They evolved quickly and changed the primary mode of data transmission so that the data now transfers via the mobile phone network (GSM) rather than satellites.

The evolution of tags can be illustrated using those provided by MTI (Microwave Telemetry, Inc).

The first GPS tag was an Argos/GPS hybrid and used both Doppler shift and GPS to provide location data. The 105GPS could provide data with an 18m accuracy. 105 is the tag's weight in grams. The main constraint was the battery life (~2.5 years). There was one GPS fix at noon and every 10 days these were transmitted to an Argos satellite. These tags provided a lot of information about the broad movements of young golden eagles.

The next generation were lighter (70g) and used solar powered batteries. This extended the expected life of the tag and allowed a greater frequency of location records, typically once every three hours.

The current generation also weigh 70g and use solar powered batteries giving expected transmission lives greater than three years. The big change is that data are transferred via the GSM mobile phone network rather than the Argos satellites, meaning that they can provide a location up to once per minute. The fix, or location, rate is determined by the state of the battery which is, in turn, determined by the weather. These tags provide information about latitude, longitude, altitude, speed, course, locational accuracy plus engineering data about the tag (temperature, battery voltage, activity) which is useful to identify if a tag has stopped transmitting because of a fault or a possible illegal killing.

The tag is attached to the eagle using a harness, a little like the type a parent might use to keep a walking toddler safe. The harness is stitched into place (not to the bird!) using linen or cotton thread which is designed to decay over time so that the harness will fall off the bird, hopefully not before the tag has ceased to operate. Generally, tags are fitted to young birds before they have fledged. They are removed from the nest (for safety reasons) and processed as quickly as possible by trained and licenced raptor workers. A falconer's hood calms the bird. Once the tag is fitted the young bird is returned to its nest. An extensive analysis of UK and international data demonstrated that fitting tags to golden eagles did not harm them (Whitfield, D.P. and Fielding, A.H. 2017. Analyses of the fates of satellite tracked golden eagles in Scotland. Scottish Natural Heritage Commissioned Report No. 982. https://www.nature.scot/snh-commissioned-report-982-analyses-fates-satellite-tracked-golden-eagles-scotland)


Microwave Telemetry Inc.
Columbia, MD USA
GPS/GSM 20-70-70
Tag
Harness strap
(not yet in place)