

## Satellite Tracking of Raptors – How PTTs Changed Our Lives

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The development of the technical side of satellite telemetry over the course of our raptor studies can be divided into three phases: the period during which only battery-powered transmitters with Doppler locating were available, the period during which solar-powered transmitters with Doppler locating were used, and finally the period during which transmitters with GPS locating could be employed.

We tracked medium sized species such as the Osprey from 1992-1995 using battery-powered PTTs with Doppler locations. The PTT life expectancy was about one year according to our experience when programmed to send for several hours every few days. We obtained a maximum of 100-150 locations from these PTTs. From 1995-2003 we used solar-powered PTTs with Doppler fixes for medium-sized raptors with a life expectancy of several years (one case of 9 years) providing thousands of ARGOS locations per annum when sufficient light is available. Since 2004 we have used solar-powered PTTs with built-in GPS devices providing fixes precise to within a few dozen metres. These PTTs furnishing also data on flight speed, direction and altitude allow analysis of behaviour in detail for Ospreys and other similar-sized raptor species.

Depending on the size of the birds other PTTs are available. We used our first PTT with GPS fixes on an adult Imperial Eagle in 2003. Since 2007 we have used 22g PTTs with GPS locating devices for Black and Red Kites and since 2008 we have been tracking a Eurasian Hobby (*Falco subbuteo*) with a tiny 5g PTT, however with Doppler fixes.